ON CARCINOMA ORIGINATING IN THE SUPRARENAL MEDULLA IN CHILDREN.

BEING THE THESIS PRESENTED FOR THE DEGREE OF M.D.

BY

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I N T R O D U C T I O N.

It is my intention in this paper to discuss a form of malignant growth, which arises in the suprarenal medulla in children in relation to:-

1. its morbid anatomy
2. its etiology.
3. its clinical features.
4. its diagnosis, and
5. its prognosis.

I intend discussing this disease only in so far as it occurs in children, and undoubtedly the majority of the cases do occur in children, though in the literature I have come across a few cases in adults, for instance, cases 14 and 24 of Richard's[28] series, where growths were found in the suprarenal and in the cranial bones etc. Albrecht[2] also has published

several cases of hypernephroma in which growths were found in the skull.

By the courtesy of the Medical Committee of the Hospital for Sick Children, Great Ormond Street, I am enabled to use 19 cases which have never been published, 4 of which have occurred during the past 18 months, and those I have been enabled to watch during life, and afterwards to perform the autopsy upon them.

In addition I have collected from the literature 32 cases, some of which were published as cases of malignant growths affecting the suprarenal capsule primarily, but many having other diagnoses.

These latter, however, I hope to show belong to, and should be included in, the same class as the former ones.

R. Hutchison [16] in a paper published in 1907 "On Suprarenal sarcoma in Children with

metastases in the Skull" appears to have been the first to draw attention to a "definite" 'clinical syndrome' occasionally met with in children" in which there was sarcoma of one or other suprarenal with metastases in the bones of the skull, and he brought forward 10 cases in support of his view.

This paper was followed by one in 1908 by Tileston and Wolbach [36] on "Suprarenal Sarcoma in Children" and they published one case which they had themselves observed and in addition collected 3 others from the literature on the subject. Hutchison's paper chiefly viewed the disease from the clinical side, Tilston and Wolbach's chiefly from the pathological aspect.

Besides those two papers, I have been unable to find any other, which has discussed this subject as a whole, though many authors have written on the particular case they were publishing.

In children, however, I believe the cases of malignant disease arising in the suprarenal medulla are much more common than previous investigators have supposed, and that the cases previously described as such have only embraced a portion of those resulting from this cause, for the reason that it has been generally accepted that the spread occurring in this disease, is by the vascular system, whilst it actually takes place by means of the lymphatic system.

Further that the cases previously described as Suprarenal Sarcoma in children, with metastases in the skull only include those that have spread by means of the Thoracic duct, and have their primary growth in the left suprarenal. Of this class of case, I have collected 21 cases.

But there is another class of similar growths, which originates entirely in the right suprarenal medulla, (with the exception

of 2 cases, in which both were affected, right more than left), and in which the spread is by the Right Lymphatic duct, which gives rise to an entirely different set of symptoms during life, equally different pathological appearances on post-mortem examination. Of this class I have collected 30 cases.

I propose in the first place to indicate what I believe to be the mode of spread, and then to give the notes of my cases, shewing in each instance how they support my hypothesis, after which I shall discuss the etiology, followed by a description of the clinical course, diagnosis and prognosis of the two classes of cases.

A N A T O M Y.

The facts I quote in this connection are in the main, taken from "Cunningham's Text Book of Anatomy."

I wish especially to draw attention to

several important differences between the two suprarenal capsules.

(1) "The Right Suprarenal is placed between the posterior surface of the right lobe of the liver and that portion of the diaphragm which covers the side of the spine ".

"Only a small and variable part of the lower portion of the anterior surface of the right suprarenal capsule is covered by peritoneum" the remainder of the anterior surface being in contact with the liver and in this part we have the hilus , situated close to the upper border, through which emerges the capsular veins and lymphatics. Now it is just this portion of the liver, i.e., the part uncovered by peritoneum, which is drained by the Right Lymphatic duct.

(2) The Left Suprarenal Capsule is covered by peritoneum on the upper part of its anterior surface, the lower part being uncovered, and in this part we have the hilus, from which

emerges the left capsular veins and lymphatics, and these run downwards to join the renal vessels.

I reproduce the illustration, showing this, from the same book.

A point of interest which has been pointed out by Rolleston,[31] and which I myself have had many opportunities of observing is that at birth, the suprarenal is about one-third the size of the kidney, as compared with the normal proportions of 44 - 1 as found in the adult.

Quain[34] states that the suprarenal is nearly as large at birth as in adult life.

We know that malignant disease of the other tissues is extremely rare, before adult life is reached. Does, then, the fact that this gland reaches its adult stage so early, account for carcinoma occurring here in children?

HISTOLOGY OF THE MEDULLA.

"Here we have a fibrous stroma continuous with that of the cortex, forming an irregular meshwork, the spaces of which are occupied by cells of very variable shape, and somewhat similar to epithelium in appearance" (Cunningham[9]). Their protoplasm is granular (Schäfer[32]).

DEVELOPMENT OF SUPRARENAL.

Differences of opinions exist as to the origin and nature of the suprarenal bodies. All, however, agree that the cortex and medulla are of different origin, and in Elasmobranchs the two parts are quite separate, the human medulla corresponding to the paired suprarenals of that species.

This difference of opinion, concerns the cortex only, it being generally accepted that the medulla arises from the group of cells

P H Y S I O L O G Y.

As to the function of the medulla it is generally agreed that it produces the internal secretions, but that the cortex is in some way concerned with it.

"Although it doesn't contain any pressor substance it is conceivable that the cortex plays an essential part in the early stages of the formation of the adrenals , and that the process is elaborated and completed in the medulla, in which alone the full activity of the secretion is acquired". (Rolleston)[30]

The secretion so produced is a vaso-constrictor substance which raises the blood pressure by acting on the terminals of the sympathetic.

MORBID ANATOMY.

ORIGIN OF PRIMARY GROWTH

Two classes of tumours arising in the suprarenal body have been described: -

those arising (a) from the cortex and
(b) from the medulla,

As we have seen, those two parts have different origins, so also tumours affecting them have quite different characters.

(a) TUMOURS OF THE CORTEX.

Bullock and Sequeira[5] collected 12 cases of tumour in this region in children, all of which gave peculiar and definite clinical manifestations, viz: - "a precocious development of hair on the face and on the genital organs, and usually a premature development of the genital organs and the accessory genital glands at the same time."

The suprarenal tumour was usually large, and sometimes there were metastases in the liver and lungs, and in all cases the growths were carcinomatous(two were described as large-celled

sarcoma. In their own case, the tumour had almost exactly reproduced the zona fasicularis of the suprarenal cortex.

Guthrie and Emery[14] have further subdivided such cases into (1) the obese type, occurring in both sexes, and (2) the "infant Hercules" type, found only in males and shewing true sexual precocity."

These cases, however, are clearly differentiated, both by clinical and pathological evidence, from those I am dealing with.

(2) Those arising from Medulla.Growths in Suprarenal.

The growth here is of varying size, for instance, in case 44, the Right adrenal contained a nodule the size of a parge pea, whereas in case 42 the growth connected with the same suprarenal weighed 12½ lbs. The largest occurring in the left suprarenal weighed 4½ lbs. (Case 5), though many are described as being as large as the child's

head, and the smallest on this side was the size of a walnut (Case 8)

In appearance it is of a pale ivory colour, but numerous large haemorrhages usually occur, and so you get colours varying from dark red to ivory - a great part of it being salmon-coloured.

The consistency is firm and elastic, but again as a result of the extravasation of blood, and also from necrosis of the older portions, you get soft, cystic areas occurring, thus giving a want of uniformity to the mass.

When small it is round and ovalshaped, but as it becomes larger its form becomes less regular, though as a rule it remains more or less rounded.

It, of course, lies behind the peritoneum, though on rare occasions it has ruptured through this, but in addition it appears to have a firm capsule, which is smooth and glistening on its outer surface.

A point of great interest is that in many cases, part of the suprarenal capsule may be seen, adherent to the tumour mass - in some instances much flattened out; in others only a small part may be seen, whilst in still other cases the capsule may appear at first glance to be little affected. So much so, was this the case, that in case 29 I at first thought both capsules were free, and it was only on making a section across the mass that I found that the Right Suprarenal body was continuous on its inner side with the growth.

This is due to the fact that the cortex is not involved in the new growth and may retain its normal position. This is shewn in the painting of the tumour found in Case 29.

Also two specimens removed from cases 4, 8, and 22, which have been preserved in the Hospital Museum, shew this very well, the

Catalogue description of Case 4 pointing out that "the suprarenal body is expanded over the tumour like a hood, and is continuous with it internally.

A similar condition has been noticed on many other occasions (see cases 3, 4, 7, 8, 19, 20, 22, 29, 33, 38, 44, 48 and 49.)

HISTOLOGY.

The cells are round or oval in chape, almost as large as a red blood corpuscle, being about 6 ~~in.~~ in diamater, and appear to be made up chiefly of nucleus. The protoplasm is granular, and stains readily by the haematin eosin method.

In the section of the primary growth from case 22, the cells are seen arranged in clumps, with a delicate supporting framework of long narrow cells with spindleshaped nuclei.

In addition the growth was surrounded by a thick fibrous capsule, from which coarse

trabeculae passed inwards, the finer fibres arising from these. Extravasation of red blood capsules had occurred into many of these spaces.

Examination of sections from the primary growths in cases 1, 2, 3, and 29 give similar appearances, though the stroma is better marked here; the cells however have the same character in all. Some formed bloodvessels are seen in the different sections.

In case 3, I shew unaffected cortex present in the same section as the new growth which is also shewn.

SECONDARY GROWTHS.

These of course, vary somewhat according to the position in which they are found, and the most common sites are the lymphatic glands, bones (ribs, sternum and cranial bones), liver and lung.

1. IN THE LYMPHATIC GLANDS.

Here the characters are similar to that of the primary growth - the gland may be greatly enlarged, firm and ivory coloured, or soft and salmon-coloured if haemorrhages have occurred. In the same gland all varieties may be seen.

Histologically the appearance is the same as seen in the primary growth (with case 2, I shew a section of a lumbar gland, and with case 1, a gland removed from the left cervical region.

IN THE BONES.

(a) Ribs.

Here the growth occurs in the bone marrow which in children is always red narrow, and is closely allied histologically and functionally to lymphadenoid tissue (Hektoen)[15]

Anatomically a rib consists of an inner and outer thin layer of compact tissue,

and from observations I have made, the two compact layers appear to be of equal thickness. The whole bone is further encased in a sheathe of periosteum. The sternum is similarly constructed.

When secondary growths occur here they give rise to a very striking appearance, for on viewing them from the inner aspect, it looks as if each rib had been "upholstered" from its posterior end to its chondral junctions. The outer surface of the rib is never so affected.

On palpating these growths from the inner side, the "upholstering" effect is carried still further, as they are soft, elastic, and retain their shape after palpation.

On section the outer compact layer of bone is seen, unaffected. The inner compact layer however cannot be seen, its place being taken by semidiffluent dark red material, which is bounded internally by the

periosteum.

The sternum when involved has similar characters, and here the growth remains confined to the part of the bone in which it has originated; manubrium etc. Why is it that this bulging occurs only on the inner aspect of these bones? I believe the explanation to be a physical one. The growth takes place in the central, cancellous portion of the bone, and presses equally in all directions, but owing to the shape of the rib, the tension of the outer convex surface must be much greater than that on the inner concave surface, and the latter yields to the pressure; in other words the expansion takes place along the line of least resistance.

SKULL.

In this region, not only are the bones of the calvarium affected, but also the other bones of the skull. The sphenoid, especially

has often been noticed and this probably causes the exophthalmos so often present. I have found in one of my cases (No. 1.) growths in the interior of the superior and inferior maxillae, and other cases have been recorded, but these have not been noticed so often as the growths in the flat cranial bones, probably owing to the difficulty in examining these at the autopsy. In the case of the flat bones of the skull, any of which may be affected, the growth begins in the diploë between the two layers of compact bone, and causes bossing of both surfaces, the external being usually the more marked. Internally, it pushes the dura mater in front of it (rarely perforating it), and compresses the cerebral cortex, not infrequently causing thrombosis of some of the superficial cerebral veins, situated in this area.

In the other cranial bones, the growth

occurs in the centre of the bone, and the bulging when it does occur, takes place at definite parts - probably the weakest.

The naked-eye appearances of the growth here, correspond closely to that found in the ribs, but often here, one sees ivory-coloured nodules, especially in the smaller and newer growths.

Two other bones are recorded in this series of cases, as being affected. In case 6, a nodule was felt on the right tibia during life, but does not appear to have been examined afterwards, and in Case 7, the growth had involved the dorsum ilei on the two sides. Histologically the growth in those areas is very similar to the primary growth (see section of skull of Case 2). Tileston & Wolbach, lay stress on the finding of "rosettes" of cells in the secondary growths, but these observations I have not been able to confirm.

LIVER.

The deposits here are found either under the capsule; or in the substances along the portal canals.

They vary in size greatly, and you may see only one or two, or they may be very numerous.

As a rule, (in all the cases I have seen) they do not cause either depression or protrusion of the surface of the liver. They have an ivory-colour, and occasionally are streaked with haemorrhages.

Microscopically, they shew the same variety of cell, as the others and these are grouped in the portal canals.

LUNG.

The growths here are situated either under the pleura or alongside a bronchos. They may be ivory-coloured nodules, or else shew haemorrhagic areas.

Histologically they have the same characters as the others.

Other growths will be dealt with under the case in which they have occurred, but it is worthy of note that in none of the cases I have collected have growths been recorded either in the Spleen or Heart.

MODE OF SPREAD.

v. Rechlinghauser [27] in discussing the question of the mode of spread of the secondary carcinomatous deposits in bone, when the primary source is in certain glands (prostate, thyroid, and mammary glands are the chief ones) maintained that the spread occurred through the blood stream.

Further, that the primary deposit took place into the vascular channels of the bone marrow, sometimes by a mass large enough to block the channel, at others by the stagnation of even isolated malignant cells in the periaxial stream in the medullary sinuses, and their multiplication there.

The lympathic glands similarly favour the settling of malignant cells, owing to the relatively wide irregular channels and the slow stream.

Elaborating this view, he believes that when malignant cells are circulating in the blood, the greatest number of metastases should occur in

the bones, and in those bones which are subject to the greatest amount of strain and to the most frequent variations of temperature. The order of the involvement of bones he thus thinks should be vertebrae, femora, pelvis, ribs, sternum, humerus, flat bones of skull, fibula, tibia, radius and ulna.

He thought that the lungs escaped, owing to the fact that the capillary channels here were narrower, and so the stream was quicker, and the carcinomatous cells did not settle down.

Neusser, on the other hand, advanced a theory of a blood relationship between mammae, thyroid, prostate and bonemarrow, but though rare, nodules of growths have been found in the lungs in these cases.

This has been the view taken by those who have discussed this point in relation to the secondary growths occurring in connection with disease of the suprarenals, and Tileston and

Wolbach[36] state that "in all sections of the tumour which include adjacent normal tissues, the veins and lymphatics of the latter contains clumps and often rosettes of tumour cells." Hutchinson[16] says: - "why malignant tumours of the suprarenal tumours (? bodies) tend to have their metastases mainly and sometimes exclusively in the bones it is impossible to say."

With such an explanation, however, I am not in accord, and it is difficult to see why only certain bones, viz. ribs, sternum and cranial bones should be affected, if the carcinomatous cells are travelling in the bloodstream, and the rest be unaffected; further, why should only a certain definite group or groups of lymphatic glands be involved, and these always in continuity, and the remainder be entirely free.

Moreover, other structures, such as liver and lungs, are frequently involved, and an organ like the spleen, with its wide blood channels, has shewn no growth in any of my cases.

Lastly, I am convinced that there is a large group of cases, associated with primary disease of the Right Suprarenal body, in which there are no secondary deposits in the bone.

The explanation is to be found in the fact that the primary growth of the suprarenal medulla gives rise to secondary deposits, not through the bloodstream, but by the lymphatic channel.

The apparent anomalies, quoted above, can be explained, and can only be explained, on this assumption.

It is unfortunate that this tumour has always been put down as a sarcoma, owing to the fact that it consists of round cells. But when examined more closely, they are found not to be of such uniformity as appears at first sight and Tileston and Wolbach[36], who themselves call the tumour a small round celled sarcoma, give an illustration in their paper, which shews the cells to be of various sizes and shapes, and also shews one in mitosis.

Then again, they closely resemble the normal cell of the suprarenal medulla. Further, as we have already observed, the suprarenal medulla is neuro-ectodermal in origin, and therefore we would expect tumours originating there to be carcinomatous.

Of late years, the view has been gaining ground that these cells are not sarcomatous, and Rolleston[30], for instance, says in this connection "the primary malignant growths of the medulla are histologically more allied to gliosarcoma than to carcinoma. It is obvious that these tumours form a special group, and it is probably most convenient to describe them simply as malignant hypernephroma.

Again Hutchison[16] speaking of Case 3, says, "there was certainly some doubt whether the tumour should be classed as a sarcoma, or as a papilloma"

Aisenstein[1] classifies his as an endothelioma belonging to the hyper group (Case 14), whilst Prof. Welch, who examined the tumour in

Case 48, says, "not certainly sarcoma", but he is inclined to regard it as such.

But the most important evidence in favour of their being carcinomatous is the manner in which they become disseminated, and this we will now turn our attention to.

As I have already stated, I believe the spread to take place by the lymphatic system, and the more markedly to emphasize this, I take the liberty of introducing here a description of the lymphatics of the cavities of the body, in the light of which I shall record my cases and shew how they correspond. Unfortunately many of the cases are deficient in the description of the glands affected, but even in those points of great interest have been noted.

DISSEMINATION, WHEN PRIMARY GROWTH IS IN LEFT SUPRARENAL.

LYMPHATICS.

The following description of the lymphatics

of the abdomen, thorax, and head and neck, is compiled from the description given by Profs. Alfred H. Young and Arthur Robinson, and by Professor Thane

The lymphatics of the L. suprarenal capsule unite with those of the L. Kidney at the hilus of the latter organ, and then pass inwards to a group of the median lumbar glands lying over the renal bloodvessels.

These glands lie along the side of the aorta, and receive afferent vessels in addition (1) from the lumbar portion of the vertebral column and the deeper portions of the posterior part of the abdominal wall in the immediate neighbourhood;
(2) from the common iliac glands;
(3) from the external iliac glands;
(4) from the internal iliac glands;
(5) from the lateral lumbar glands;
(6) from the testicles or ovaries;
(7) from the upper part of the uterus;
(8) from the subaortic glands;

(9) frm the crura of the diaphragm;
(10 from the ascending and descending portions of the colon.

Their efferent vessels unite with some of the efferent vessels of the lateral lumbar glands, and they terminate in a common lumbar lymphatic trunk, which opens into the receptaculum chyli. From this runs the thoracic duct, passing upwards through the aortic opening of the diaphragm, and entering the posterior mediastinum, and here to the level of the 5th dorsal vertebra it lies in the front of the Vertebral Column and to the right of the middle line; it then crosses to the left and ascends through the posterior mediastinum to the root of the neck, where it turns outwards to join the commencement of the L. innominate vein and so terminate. Passing out by the nutrient foramina of the ribs are the lymphatics from the interior of those bones, these unite with the intercostal lymphatic vessels, which run to the intercostal

glands lying in the posterior parts of the intercostal spaces near the heads of the ribs, and their efferent vessels join the thoracic duct.

The upper deep cervical glands extend from the base of the skull to the bifurcation of the common carotid artery. They receive afferents from (amongst others) the interior of the cranium. Their efferents terminate in the lower deep cervical glands, which lie along the lower part of the internal jugular vein. The efferents from the latter unite to form a common jugular lymphatic trunk, which opens on the L. side into the thoracic duct.

LIVER.

This organ possesses a superfical and a deep set: 1, The superficial set lie beneath the periosteum on (a) the visceral and (b) the parietal surfaces of the organ. (a) The vessels from the vesceral surface pass chiefly to the hepatic glands, which lie between the layers of the lesser omentum: but some of them from the back part of this surface

on the R. lobe, join the lumbar glands, and others from the back part of the L. lobe, go to the coeliac glands.

(b) The vessels from the parietal surface pass in various directions. Those from the anterior part of this surface pass down to the inferior aspect and join the hepatic glands in the lesser omentum.

2. The deep lymphatics accompany (a) the portal or (b) the hepatic veins.

(a) The former set pass out through the portal fissure and join the hepatic glands, the efferent vessels of which join the coeliac glands, and ultimately the receptaculum chyli.

(b) Those which accompany the hepatic veins pierce the diaphragm with the vena cava, and having formed connections with the group of glands at its upper end, within the thorax, turn down and join the beginning of the thoracic duct.

C A S E S.

The first one I take is one which I myself observed during life, and on which I made the post-mortem examination.

CASE I.

P.M. XXII. 224.

M.P. aet. 2, female.

Admitted Aug. 23, 1909, died Sept. 9th 1909, under care of Dr. Voelcker.

Has been irritable and getting pale for past months. On Aug. 9 right eyelid became black in morning, and during day a lump appeared on the right temple, also one above the right ear. Within next 2 days the right eye became prominent and this had gradually increased. Left upper eyelid became black on Aug. 20th. Keeps putting her hand to left ankle, as if she had pain there. Has complained of pain on micturition and urine has contained a white sediment. Has not noticed any

abdominal swelling. Appetite very poor. No vomiting.

No previous illness.

Both parents alive and healthy.

3 children alive, of which patient is the youngest - others healthy.

5 dead - all under 6 mos. (from measles, pneumonia, tubercular meningitis and 2 from convulsions.) No miscarriages.

C.O.A. extremely pale, fairly well nourished child. Prefers sitting up in bed. No glandular enlargement. At outer end of Right eyebrow is a rounded swelling, soft, but moveable, with a base about as large as a penny.

Situated just above Right ear is a similar, smaller swelling.

A still smaller one just above Left ear.

Marked exophthalmos on Right side, eye being pushed forwards and directed downwards. R. eyelid shews yellowish discolouration. Ecchymosis at inner end of L. upper eyelid. No exophthalmos

on L. side. No facial weakness. Occasional twitching of fingers of L. hand. Knee jerks not obtained. Plantar reflex - flexor.

HEART not enlarged. Faint systolic murmur at apex

LUNGS. nil abnormal detected.

ABDOMEN: full, distended, Large firm, rounded mass in L. hypochondrium, projecting from under L. costal margin, and extending downwards to within 2" of iliac crest. Extends inwards to middle line. Not moveable, and doesnot move with respiration. Dulness on percussion over this area, elsewhere resonant.

URINE. Acid. No albumen. No sugar. No acetone. microscopically nil.

Aug. 29 Blood pressure = 80 mm. mercury

" 30 More irritable. R. eye is more proptosed and cornea is slightly glazed, causing a good deal of irritation. Lump on outer side R. orbit is

larger, about size of half an egg.

HEART. Systolic murmur best heard midway between Tricuspid and Mitral areas.

ABDOMEN. Mass much larger, now extends across midline in upper part, very firm and solid.

Aug. 31. L. upper eyelid very oedematous. Exophthalmos of R. eye more marked. R. cornea is glazed, and there is a discharge of muco-pus. Slight amount of bloodstained fluid dribbles from mouth.

OPHTH. EXM. Only L. side could be examined. Disc very pale and swollen, exudate, chiefly to nasal side, veins congested.

Sept. 3 Urine acid. No albumen.

" 5 Blood pressure = 78 mm

" 8 Small lump has appeared close to R. side of region of anterior fontanelle.

Grinding her teeth frequently

" 9 suddenly collapsed and died in early morning.

BLOOD EXAM.

CASE 1.

	Aug. 25th
Haemoglobin	40 %
Erythrocytes	2,040,000
Colour Index	1
Leucocytes	6,500
Differential Count	
Polymorphonuclears	38.5 %.
Large Mononuclears	3 %.
Small Lymphocytes	46 %
Large "	10 %
Myelocytes	2.5 %.
	14 nucleated Reds:-
	10 Normoblasts
	2 Microblasts
	2 Megaloblasts
	Some of the Red Blood Corpuscles shew chromatophilic changes.

POST MORTEM.

HEAD. See under "Bones"

BRAIN. Apparently under considerable pressure as there was evidence of formation of "pressure cones" on the cerebellum. Over the R. frontal lobe, about the middle of the superior convolutions, a small tongue of new growth had perforated the dura and depressed the brain substance to the extent of about ½", but was not attached to it. The brain itself appeared normal.

SPINAL CORD: appeared normal

EYES. R. marked, L. somewhat protruded. R. cornea ulcerated. Both eyes were lying in a mass of new growth, but were not involved. On the R. side the optic nerve was also surrounded by growth.

MIDDLE EARS. R. contained a dark-greenish, odourless liquid fluid. L. contained a small broken down mass of new growth, similar in character to that found elsewhere.

THORAX. See under "Glands" and "Bones"

PLEURA. Both contained several ozs. thick, reddish-brown fluid.

LUNGS Numerous small petechial haemorrhages over all lobes. On section similar small haemorrhages, with some paler areas.

HEART Not enlarged. Several petechial haemorrhages over ventricles.

ABDOMEN. On opening abdomen, about a pint of thick reddish-brown fluid escaped. A large, soft reddish-brown tumour, breaking down on anterior surface, was found occupying the L. lumbar and hypochondriac regions, extending into the umbilical and epigastric, and slightly into the hypogastric regions.

THE STOMACH lay in an almost vertical position

THE PANCREAS was pushed very much forward and was situated at the upper and inner angle of the mass.

THE LIVER was much enlarged, and pushed over somewhat

to the R. side.

THE SPLEEN was displaced upwards and backwards, and closely applied to diaphragm.

The Transverse and Descending Colon passed over the top and down the outer R. side of the tumour, it was closely applied to the growth, though not involved in it.

The anterior abdominal wall was unaffected.

THE TUMOUR occupied the region above mentioned, but only extended slightly across the middle line.

It consisted of a large, irregularly nodulated reddish-brown mass. It was very soft, and towards the middle line had broken down and burst through the peritoneum, and here consisted of soft material. Elsewhere it was entirely retro-peritoneal.

It was rounded, and had sharply defined borders on all sides, with no invasions of the neighbouring

organs.

L. KIDNEY was displaced upwards, lying at the L. upper and outer angle of the mass. It was not enlarged, and appeared normal on section. Some emlarged glands were seen at hilus projecting slightly into pelvis.

L. SUPRARENAL could not be found, its place being taken by the new growth. On section the growth was found to be divided into two parts, an upper encapsulated portion, as large as a bird's egg, ivory coloured, with numerous haemorrhages into its substance; and another portion 5 - 6 times as large, much softer and much more bloodstained. The upper part probably represented the suprarenal capsule, the lower enlarged glands.

LIVER. The whole surface was mottled, with alternate whitish and reddish areas, most marked over the L. lobe on the undersurface, and also on the lower aspect of the R. lobe. These areas were covered

by peritoneum. On section they were roughly circular and extended slightly inwards. The liver substance in the interior of the organ seemed to be unaffected.

SPLEEN. Slightly enlarged. Not attached to tumour. Substance normal. No new growths.

R. KIDNEY. Not enlarged. Capsule stripped easily Cortex and medulla appeared normal. Pelvis not dilated. No growths.

R. SUPRARENAL. Normal in position and appearance.

PANCREAS Easily separated from tumour and not invaded.

STOMACH & INTESTINES unaffected.

BONES. Skull. On removing the scalp, a small rounded nodule, covered by smooth periosteum, was seen just to the R. of the anterior fontanelle. A larger rounded swelling was situated at the R. external angular process, with a base about as large as a

penny; running horizontally backwards from it, and between it and the ear were two smaller rounded swellings. One similar, rather smaller swelling was found over the L. external angular process. All were covered by smooth periosteum and were soft and fluctuating.

On the inner side of the calvarium the dura mater was seen bulging at the posterior part of the frontal bone, just to the right of the middle line. The tongue of new growth, previously described had ruptured through it here, and was imbedded in the brain substance.

Two larger, flat bulging areas were seen on the posterior ends of the temporal bones, one on either side. These were covered by smooth dura and on stripping it off were found to consist of soft, reddish new growth of the consistency of bone-marrow and similar to that found in the other affected parts.

On removing the plate of bone covering in the lesser wing and body of the sphenoid, similar growths were found.

A large swelling was seen at the back and outer side of both orbital cavities, which had ruptured into the orbits, but had not affected the eye itself.

On the R. side, and less markedly on the left, this soft reddish material extended backwards through the optic foramen along the side of the cavernous sinus, and down to the foramen lacerum medium where the carotid canal opens, and where it became continuous with the chain coming up to the base of the skull. Most of the foramena at the base shewed similar material passing through them. On passing forceps into the interior of the superior maxillary bones, similar new growth was fond.

Both inferior maxillae were swollen about the angle, and were also the seat of disease.

RIBS: were all swollen and "upholstered" on their

inner surfaces, soft and resilient to pressure, and completely covered by periosteum and pleura. On section the outer bony plate was unaffected, the remainder being soft, reddish brown and enlarged.

The inner aspect of the manubrium sterni shewed the same changes, but the rest of the sternum was unaffected.

L. FEMUR was exposed and cut into, and appeared normal, and other bones were apparently unaffected.

GLANDS. These rose in definite sets.
One chain of very large glands, infiltrated with soft, reddish-brown material was found running upwards along the posterior mediastinum to the root of the neck, where it divided into the two anterior cervical series, and here on the L. side was one very large discrete gland. The two sets passed upwards to the base of the skull, sending prolongations to the carotid foramina, especially marked on R. side, also to the horizontal rami of the

lower jaws, backwards under the ear to the mastoid process and mastoid foramen. Another chain ran along the portal vessels and could be traced into the liver.

Still another chain ran downwards along both Common Iliac arteries and then along the external iliac on the L. side, along the internal iliac on the R.

On the L. side it passed forwards under Poupart's ligament, the nodules gradually getting smaller and smaller, and terminated just as they entered the lower extremity.

On the R. side, the chain reached the pelvic organs, and the R. ovary was found to have a small haemorrhage in it. The L. ovary appeared normal. Where the mesentery ran across the tumour, the mesenteric glands were enlarged, though small, and more reddish than the other glands.

The bifurcation glands and those along the

trachea were affected.

Lastly, along the anterior edge of the diaphragm, mostly on the L. side, but crossing the middle line was a chain of enlarged, soft, affected glands, and also many small enlarged glands in the intercostal spaces.

There were no enlarged glands along the R. renal vessels, but one large one was firmly attached to the Inferior vena cava at this level, though on opening up the vein, the interior was found intact.

The Aorta ran along under the mass and was quite unaffected.

MICROSCOPICAL EXAMINATION.

1. Tumour on section shewed the typical cell, large nucleus, small amount of protoplasm.

2. LIVER. Here similar cells were found grouped around the portal vein in the portal spaces. The surrounding liver lobules often shewed necrotic changes.

3. Glands were similar to the tumour, the supporting stroma being better marked. Areas of extravesated blood corpuscles were frequent.

4. LUNG. The section shews the growth bordering on a bronchus.

5. Examination of growth on outer surface of dura mater and of rib gave appearances similar to that in gland.

A phtograph of a nodule in the lung, and one of a section of a left cervical gland is given

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Before discussing this case, it is necessary to point out what has long been accepted, that is, the "backward lymphatic transport", which is seen so frequently in the casesunder consideration.

Hektoen[15] in this connection points out that in carcinoma of the breast, with regional metastasis in the axillary glands a backward lymphatic transport may carry carcinoma-cells into the humerus

to give rise to secondary carcinoma.

The forward transport in this case was well seen - L. capsular, lymphatic, lumbar glands and Thoracic duct through posterior mediastinum. "Backward transport" had taken place into (1) common iliac glands; 2. L. external iliac chain, these getting smaller and smaller as they passed towards femoral set, which were unaffected: (3) R. internal iliac, and on this side ovary was affected; (4) those from the colon; (5) the superficial set of liver lymphatics; (6) the intercostal set; (7) the bifurcation and tracheal lymphatics; (8) the cervical set on the L. side, and owing to the copious anastomosis those on the R. also (9) those running forwards to the angles of the jaw, and the inferior maxillae themselves (10) inside the cranium the spread has been described.

In no instance was an organ or bone affected, without the corresponding set of glands also being affected, and equally important, the other lymphatic glands, bones and organs of the body were unaffected, as far as a careful search could detect.

In this case the dura mater had been upturned at one point, but the tongue of tumour which protruded had simply depressed the cerebral substance, as a foreign body might have done, and possessed no attachment to it.

. . . .

The next case (No. 2 in the table) was also under my observation during life, and here also I made the post-mortem examination.

CASE 2.

P.M. XXII 66.

D. J. aet. 3½ yrs. f: admitted Dec. 14th, 1908, died April 15th, 1909. under care of Dr. Garrod.

About 2/12 ago began to complain of pain in back and left leg. One month ago went off her food. There has been no fever. Urine natural. No swelling in legs. Frequently awakes at night and cries with pain. Had measles 9 mos. ago, otherwise healthy. Both parents alive and healthy. 2 other older children alive and healthy. One dead, from heart disease following whooping cough.

C.O.A. Pale, anaemic child. Bright and intelligent. Glands a little enlarged at angles of jaw, more on left than right side. No visible swelling in joints, but left knee is tender when touched.

HEART. Not enlarged. A faint systolic murmur

heard at apex.

ABDOMEN. Soft. Liver 1 f.b. below cost. marg. Spleen just palpable - tender.

LUNGS. Nil abnormal detected.

REFLEXES. Pupils equal - react to light and accommodation. K.J. brisk both sides.

Abdominal reflexes brisk both sides.

URINE. 1025 acid. No albumen. no sugar. Heavy deposit of amorphous urates.

DEC. 31. Child is more languid, and complains of sore throat, but nothing to be seen. There is a large purpuric patch covering almost entire upper lid of left eye. There is swelling about this eye, and perhaps some proptosis. . Very small purpuric spot in right upper eyelid appeared 1 day later.

Systolic murmur at apex is easily heard.

Spleen easily palpable.

OPTH. EXMA. Optic discs slightly pinkish but edges are sharply defined.

JAN. 2. General condition rather better.

Swelling about eyes is less, and purpura is decreasing.

ABDOMEN. Soft. No tenderness. Liver felt 1½ f.b. below costal margin. Spleen palpable. No masses felt.

No joint swelling or pain.

JAN. 7. Beginning optic neuritis, more in right than left eye.

URINE. 1026 acid. No alb. No sugar.

JAN 9. General condition about the same. Slight rise of temperature (100°) for past 3 days. Haemorrhage into upper lids, still more marked in left side, and there is some into left lower lid now. Dr. Garrod believes case to be one of "Suprarenal sarcoma" and abdominal tumour is being carefully looked for.

No change in other systems. No pigmentation.

JAN. 11. Definite optic neuritis in left eye - none in right eye. Nothing felt in abdomen.

JAN.18. Fresh haemorrhage into right upper eyelid. Proptosis on both sides.

JAN. 21. Considerable resistance in left lumbar region and a mass is felt, in addition to Spleen, which does not move with respiration.

JAN. 27. Swelling of eyelids very marked, especially left. Mass in left hypochondrium very definite.

JAN. 28. T. rose suddenly to 102.8° last night, but is normal again this morning. Rounded swelling noticed on left side forehead.

JAN.30. T. still slightly elevated. Left eye much more prominent and causing pain.

Swelling still palpable in left side of abdomen. Another lump noticed on head, this time in left parietal region, just above ear.

FEB. 18. Exophthalmos about equal on the two sides. No haemorrhages in eyelids, but the bloodvessels in the upper lids are much dilated.

Large dilated veins over temples, more marked over left. Several round soft lumps over scalp now, chiefly on left.

HEART. L. bord. is ½" outside nipple line. Faint systolic murmur at apex.

ABDOMEN. Definite mass in left flank, extending towards middle line. No albumen, no blood.

FEB. 27. Proptosis more marked. Lumps on head becoming larger. Superficial veins of scalp more prominent. Abdomen - as before.

MARCH 25. Forehead bulging. Whole scalp soft and oedematous - pits on pressure. Over left frontal eminence, in left temporal fossa, and over left parietal bone are definite nodular swellings.

Blood Exam.

Case 2

	Dec. 14th	Dec. 31st
Haemoglobin	47 %	45 %
Erythrocytes	2,480,000	2,566,000
Colour Index	.9	.85
Leucocytes	10,250	11,750
Differential Count		
Polymorphonuclears	36 %	41 %
Large Mononuclears	3 %	1.3 %
Small Lymphocytes	48 %	46.3 %
Large "	11.3 %	6.6 %.
Eosinophiles	.6 %	1 %.
Basophiles	.3 %	1.3 %
Myelocytes	.6 %	.3 %.
	3 nucleated Reds in 300	1 nucleated Red in 300
	Chromatophilic changes in Reds	Chromatophilic changes in Reds

Marked proptosis , especially in left eye which is directed forwards and downwards. Noticed to be blind today for first time.

Optic neuritis very marked in noth eyes.

ABDOMEN. Flaccid. Large mass palpable in left lumbar region below spleen - can be grasped between the hands. On right side also a smaller mass felt in similar position (? faecal.)

HEART. Still has loud systolic murmur at apex.

APRIL 8. Large oedematous swelling in lower part of right conjunctiva.

APRIL 9. Right eye beginning to have ulceration of cornea.

APRIL 10. Frequent twitching of right fingers and thumb.

APRIL 14. Unconscious.

P.M. Body of markedly emaciated F. child. Many lumps on head. Enlarged glands on both sides of neck. No glandular enlargement in

groin or axilla.

HEAD. See "Bones".

BRAIN. Slight softening of inner table of skull in upper part of left parietal bone, but the dura mater was intact.

A large superficial cerebral vein, running along left Rolandic fissure was thrombosed and the brain substance in its immediate vicinity was soft and yellow. There was a little oedema of the cerebral convolutions. Lateral ventricles not dilated. Cerebellum normal.

NECK. Many enlarged glands. See "Glands."

THORAX. Bifurcation gland not enlarged.

PLEURA, Nil.

LUNGS. Collapse of lower parts of both lower lobes.

HEART. Muscle soft and flabby. Right auricle and ventricle somewhat dilated. Valves normal.

ABDOMEN. On opening abdomen, the viscera were found to be much displaced, owing to the pre-

sence of a large tumour, about the size of a cricket-ball, lying mostly under the left costal margin. The Liver had been pushed to the right so that it lay almost vertically with its left border, superior.

The Spleen was pushed upwards and backwards. The Stomach occupied a semi-vertical position, between the tumour and the liver. The Pancreas crossed in front of the mass.

LIVER. Venous congestion. No growth.

SPLEEN. Not enlarged. No growth.

PANCREAS. Appeared normal.

R. SUPRARENAL was not enlarged, or involved.

R. KIDNEY shewed no abnormality. Capsule stripped easily.

STOMACH AND INTESTINES. Nil abnormal.

L. SUPRARENAL. consisted of a large, almost circular mass 3" x 3", and from its lower border running inwards towards the vertebral column were several smaller nodules.

Wgt. including left kidney and glands = 11¾ ozs.

The larger mass had a regular surface, was bluish in colour, uniformly firm and elastic in consistency except at one point, about the centre of the anterior surface, where it was soft and fluctuating.

The glands attached to its lower border were also soft and fluctuating, with firmer elastic portions.

The mass was not adherent to the posterior abdominal wall and was easily shelled out with the fingers.

It was situated entirely behind the peritoneum. The glands however were firmly adherent to the front of the bodies of the lower lumbar vertebrae, and had to be cut away with a knife - the growths did not invade the bodies.

L.KIDNEY. was situated at the lower and inner corner of the mass, and was only attached to it by some loose areolar tissue. The renal

vessels passed over the front of the nodules of growths, which ran towards the vertebral column, but were quite free.

The Kidney was not enlarged. Capsules stripped easily.

PELVIC ORGANS appeared normal and shewed no growths.

GLANDS. Prevertebral Glands. A double chain (one on either side of the vertebral column) were seen in the abdomen. These were continuous with a single chain passing through the posterior mediastinum, again becoming a double chain in the neck and passing upwards to the carotid foramina at the base of the skull. Joining this chain was the smaller chain running from the suprarenal growth. They were all markedly enlarged, soft, and of a dark reddish colour.

Many were firmly adherent to the vertebrae and could only be separated from it

by means of the knife. The cervical group were similar and were especially large at the angles of the jaw. The glands in the groin and axilla were not enlarged.
BONES, RIBS. The inner aspect of the ribs had a curious, padded"cushiony" appearance, or "upholstering" of the ribs, as it were. It consisted of smooth, regular, flattened nodules of growth, soft and very elastic to touch. This was seen in all the ribs and also on the lower part of the posterior aspect of the manubrium sterni.

The outer surface was absolutely unaffected. These extended along the whole length of the rib, the cartilage being unaffected. On section the outer plate of bone was normal, the remainder being soft, gelatinous and dark red in colour. No growth in clavicle, pelvic bones or long bones apparently.
SKULL. The vertex shewed about 20 distinct nodular swellings, regular, with smooth sur-

face and varying in size.

There was a group of 6 or 7 forming a circle about the region of the anterior fontanelle. From this two chains extended backwards to the external occipital protuberance, and others forward to the glabellae. There were also several situated laterally over both parietal bones. Many shewed evidence of being the seat of haemorrhage, but one or two were yellowish white, soft and cut easily. The inner table was smooth, regular and hard except at one point over the upper part of the left parietal bone, where it was softened, and this corresponded to a large growth on the outer surface. On either side was a large mass bulging into the orbit, but not attached to the eye. It was covered by dura mater and on opening into it, it was found to be soft, reddish, and easily squeezed out by the finger.

There were similar soft swellings on the ascending rami of the lower jaw, but these

could not be examined further.

HISTOLOGY

1. Primary Growth shewed the common cell - round nucleus, small amount of protoplasm. I give a photograph of this shewing a vessel with a thin formed wall, containing blood corpuscles, but no carcinomatous cells.

2. Skull. Here also a section is shewn under high power, shewing cells similar to those seen in primary growths, and a vessel also is shewn, again containing no carcinomatous cells.

3. Lumbar Gland. This section shews the same type of cell, and also the large areas of haemorrhage which have taken place in the growth.

Sections taken from ribs gave similar appearances.

A portion of vertebra was examined but shewed no new growth,

This case shews an extremely simple spread:- forwards to lumbar glands and Thoracic

duct - "backward transportation" to ribs and skull. The main mass itself had reached the kidney hilus (see painting) but had not spread into it.

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The remaining cases, which are taken from the post-mortem records of the Hospital, were not observed by myself. Four of them have already been published by R. Hutchison,[16] but in an abbreviated form and I now give them practically in full.

CASE 3.

M.J. aet. 4 yrs. f. admitted June 22nd, 1906, died Oct. 4th, 1906, under care of Dr. Garrod.

Pains in arms and legs came on before Xmas 1905 and have been present with intermissions since then. Has had pain in head for 3 days.

Has had no previous illness.

Parents alive and healthy. 3 other children, all alive and healthy.

C.O.A. Fairly well-nourished, but very pale. Holds her head rigidly - she can move it to the L. but not to the R. - no retraction.

ABDOMEN. Slightly retracted. A tumour in the region of the spleen can be felt, but it is separable above from the spleen and continued downwards to the region of the kidney. It is slightly tender.

HEART. Systolic murmur at apex.

GLANDS. Small, separable and moveable glands in neck, especially on R. side. There is one large gland in R. groin, and some small ones in L. groin

They are all slightly tender.

OPHTHALMIC EXAMINATION. Optic discs blurred on both sides, outlines lost and vessels broken up, almost "choked discs"

June 25. Head more moveable, but still a little stiff. A lump has appeared on R. temple, about as large as half a cherry, fixed, hard and tender.

OPHTHALMIC EXAMINATION, July 10. Mr. J.H. Parsons.

There is well marked optic neuritis in each eye, - swelling of each disc about + 3D Discs very white, veins much engorged, some haemorrhages. There is a bright white patch near L. macula, with some pigment on it - probably other exudates which have partially organised (?).

July 11. A circular lump has appeared on forehead to R. of middle line - not very hard. Abdomen is more distended, and lump more difficult to feel.

July 16. Fresh lumps on head.

July 19. The lump on forehead now covers all the

centre of the forehead, and over it run large veins. The L. eyeball is inclined to protrude.

July 30. There are now about 8 lumps on head; the largest one is on the forehead, the second behind the R. eye.

July 31. Both eyes prominent - intraocular tension high. Abdominal mass is hard and nodular.

Aug. 10 Child has had no pain. T. normal - 101° R. upper eyelid swollen and drooped, intraocular tension increasing. Can still see, but sight is diminished.

URINE contains trace of albumen.

Aug. 11 Now has 10 lumps on head.

Aug. 15. Lump on forehead much larger, slightly soft and fluctuating in centre. A gland is noted on the L. side of the neck.

Aug. 27 Definite proptosis of both eyes. Marked ptosis in R. eye. Urine contains trace of albumen.

Sept. 10. Enlarged gland in groin.

Sept. 19. Cervical and submaxillary glands have become very large.

Sept. 21 Head larger - veins very big. Eyes more prominent. Has convergent squint. Is more feeble but has no actual pain.

Oct. 1. R. eye more proptosed. A large lump has appeared at R. angle of jaw, over which course large veins. Other lumps have increased in size.

BLOOD EXAM.

CASE 3.

	JUNE 25th	JULY 15th	AUG. 16th	AUG. 30th	SEPT. 27th
Haemoglobin	70%		60%	50%	
Erythrocytes	3,942,000		3,440,000	2,648,000	
Colour Index	.9		.8	.9	
Leucocytes	10,500	16,300	11,500	11,000	18,000
Differential Count					
Polymorphonuclears	51%	58.4%	57%	49%	50.5%
Large Mononuclears	4.5%	4.6%	10%	3%	8%.
Small Lymphocytes	31%	31.4%	11%	26%	27%.
Large "	11.5%	5.3%	21%	18.5%	16.5%.
Eosinophiles	1.5%	.3%	1%	.5%	nil
Myelocytes	.5%			2%	2.5%.
Basophiles				1%	.5%.
	No nucleated Reds Some chromato-philic changes in Reds		No nucleated Reds	2 nucleated Reds (normoblasts) seen in counting 200 leucocytes.	6 nucleated Reds seen.

POST MORTEM.

HEAD. See under "Bones"

BRAIN. Some of the growth from the skull bones had pressed upon the brain, but there was no growth in it. There was a little oedema over the vertex.

NECK. See under "Glands"

THORAX. Bifurcation gland not enlarged.

HEART. R. side a little dilated, valves normal.

LUNG. Complete collapse of L. lower lobe - ? result of pressure by tumour.

PLEURA. A lot of clear fluid in both cavities - no pleurisy.

RIBS. See under "Bones"

ABDOMEN. The general disposition of the viscera was upset by the presence of a large tumour ascending into the L. hypochondrium. The spleen was pushed upwards and backwards, whilst the pancreas was over

the summit of the tumour, being curved and displaced upwards. The stomach and duodenum both seemed to be pressed on by the tumour, and were small and displaced slightly upwards.

LIVER, SPLEEN & PANCREAS appeared normal.

R. KIDNEY. The adrenal on this side was quite normal. The kidney below it was also normal in position, size, and on section.

STOMACH & INTESTINES small but normal.

L. ADRENAL. There was here a large mass, 5" long x 4" wide, weight, including kidney and glands = 14½ ozs. The surface of the mass was irregular, shewing many nodules, some of which were white and hard, but the larger ones were softer and purple in colour - due to the haemorrhage. The mass was adherent to the posterior abdominal parietes, most firmly to the front of the vertebral column, from which it could only be separated by the use of a knife. The vertebral column was not corroded by

the growth, nor did the bone appear to be the origin of any part of the mass, though the glands lying in this position were seats of growth.

L. KIDNEY was situated at the lower and outer part of the adrenal mass, and was slightly embedded in the growth in the region of the hilum. The kidney appeared normal in size, and so did the ureter, which was traced down to the bladder.

PELVIC ORGANS normal.

GLANDS. Cervical Glands: - under each angle of the jaw was a large bunch of glands infected with the growth, many containing blood. Similarly some of the posterior cervical glands. All down to the chain of glands there were secondary growths, as well as in the glands alongside the trachea. The chain was continued down the thorax and into the abdomen. They did not corrode the vertebra, nor did any growth appear to have originated in the vertebral column.

In both groins there was a large mass of glands, many haemorrhagic - attached to the pelvic bone, but neither corroding nor originating in the bone.

In both axillae there were glands which shewed infection, most of them small and hard, only one or two haemorrhagic.

BONES. Ribs. The thoracic wall viewed from inside presented a very peculiar sight. All the ribs, with the exception of the first on each side, were attacked by the growth; this giving a very peculiar effect. The line of each rib was strictly kept, but along the line there was a large bulge into the interior. The bulging surface was perfectly smooth and had its pleural lining in the usual way, giving the effect of an internal padding to each rib - on palpation too there was a sort of cushion feeling.

The external surfaces of the ribs were quite normal. This cushioning by growths stopped at the junction of the bone with the cartilage. On section of a rib the outer wall was formed fo a thin layer of bone of which the outer surface was unchanged. The

inner surface merged into growth - which was white, and the central part just beginning to necrose slightly. There was no trace of the true inner wall of the rib.

The costal cartilages, sternum and clavicles were not affected.

The pelvis, vertebral column, and so far as could be ascertained, the limb bones were unaffected.

SKULL. Practically the whole of the vertex of the skull above the lambdoidal suture behind and the temporal ridges laterally was invaded by growth. The external surface was extremely irregular from large lumps which shewed by their colour that they were the seat of haemorrhage. Of these there were about 12 large ones, of which the one almost mesially placed in front and a pair on either side of this were the largest. The rest of the bone was affected, in some places with masses, but not shewing haemorrhages.

Inside the skull, the surface was rough and irregular, due to the presence of growth pushing down the

dura mater. There were no large masses, although the brain must have been a good deal pressed upon, most in the frontal region. The growth was between dura and bone, very firmly adherent to both, but not apparently destroying either.

There was a small amount of growth on the orbital side of the roof of the orbit on both sides.

Further there was a mass of growth in the neighbourhood of the R. malar bone.

ABDOMINAL MASS. On further examination the L. Kidney, except for its pallor, appears quite normal and shews no sign of growth.

The adrenal mass is very hard, and for the most part, consists of large white masses of growth, with small haemorrhages in its substance.

The glandular mass is separated from the adrenal mass by a groove, and in this groove, embedded in growth, is what appears to be the aorta running downwards, if so, it is rather thin-walled and small.

The glandular mass shews large areas of white, yellow, flesh-coloured and red masses on section. At the extreme top of the mass is a thin-edged, flat, wedge-shaped structure - the edge of which is yellow and the rest colourless - which is presumably the remains of the original adrenal - the edge, although adherent to the mass, can be separated from it. It is visible from the anterior aspect only.

The upper pole of the kidney is compressed and distorted in shape.

MICROSCOPICAL EXAMINATION.

1. Reamins of Adrenal and adrenal growth. Shews the growth to be composed of round and oval sarcoma cells and apparently to lie between the suprarenal and kidney proper, both of which shew little change beyond cell degeneration, due to compression and apparently no invasion by growth. (Further section shews that in continuation the suprarenal itself is the seat of sarcomatous deposit: the lower portion thinning off to enclose the growth.

2. Axillary gland - extensively infiltrated by sarcomatous deposit.

3. Secondary growth of cranium shews similar sarcoma formation with arrangement tending to be alveolar in character.

The diagnosis given in this case is: -

"L. suprarenal sarcoma with secondary deposits in the glands and membrane bones."

The forward spread is here again definitely shewn - lumbar glands and thoracic duct.

"Backward transportation" (1) to glands in both groins; (2) by intercostals to ribs; (3) to axillary glands; (4) to both sets of cervical glands, probably to R. by anastomosis; (5) to skull, and here in addition to the flat bones, the sphenoid and R. malar bone were apparently affected.

No other bones or glands shewed any new growths, as far as could be ascertained.

Here, however, as stated, the suprarenal cortex was apparently not involved.

CASE 4.

P.M. XVI, 204.

A. L. aet. 10/12 yrs., M. admitted Nov. 21st, 1901, died Dec. 6th. 1901, under care of Mr. Balance.

On Nov. 16th '01 mother noticed a swelling on the left side of the head. Two others appeared on the top of the head subsequently, very restless and fretful for past 2 days.

C.O.A. There was a tense elastic swelling, about as large as half an orange, occupying the left temporal fossa. This was aspirated and a little laked blood drawn off.

Higher up and apparently separate were two similar swellings each about as large as a walnut.

The case was diagnosed as "Infantile Scurvy" but antiscorbutic treatment proved of no avail, the swellings grew and coalesced, the left eye became proptosed, there was

much ecchymosis into the left upper eyelid, and the swelling began to spread on to the cheek. A fresh swelling appeared on the right side of the head above and in front of the ear.

BLOOD EXAM. Red corpuscles 3,1125,000, white 12,000, no abnormal leucocytes seen.

T. 102 - 104°.

P.M.

HEAD. There was considerable effusion under the scalp. On the left side a tumour reached from the superciliary ridge and the external angular process in front, to the upper margin of the ear laterally, and behind the ear well down over the mastoid process. It did not transgress the sagittal suture, but reached nearly to the lambdoidal. Internally the dura was smooth and limited the growth. The tumour had however, greatly thickened the fronto-parietal region of the skull-cap, and

caused much displacement and atrophy of the convolutions beneath.

On the right side just above and in front of the ear was a smaller nodule of new growth about the size of a large walnut. These growths were deeply bloodstained.

Cervical glands on either side of neck infiltrated with growth, but not matted and not much enlarged.

THORAX. Pleural cavities normal.

Both lungs shewed congestion along posterior border, but no other abnormality. Mediastinal glands normal.

HEART AND ABDOMEN. Pericardium natural.

Liver and Gallbladder normal. Spleen normal. Pancreas natural.

TUMOUR. Between left kidney and suprarenal body was a mass of new growth the size of a small Jaffa orange.

It evidently did not involve the kidney the upper end of which is slightly flattened.

The Suprarenal body was seen to be expanded over it like a hood, and to be continuous with it internally.

A small gland lay between the mass and the aorta. The left kidney was normal. Right kidney and Suprarenal normal. Other organs normal.

In this case the diagnosis was given as:-

"Sarcoma of Suprarenal".

In this case the description given is of the briefest, and leaves many "links" wanting.

The Suprarenal was stated to be spread over the tumour, which was situated just above the left kidney, like a hood. This was almost certainly the cortex which was so placed, and was not unnaturally mistaken for the whole gland.

Again the mediastinal glands are stated to be normal. This would be so in the case of the anterior mediastinal glands, the ones which are oftenest noticed, but the posterior glands might well be unobserved, unless one was on the look out, for when the thoracic organs, including oesophagus are removed, the glands come away with them, and so would escape detection.

It states however that the cervical glands on either side were infiltrated with

new growth, and this portion of "backward transportation" was completed by the numerous growths in the cranial bones.

The ribs are not mentioned.

One lumbar gland at least was involved and lay between the suprarenal growth and the aorta. It is pointed out here, that which I have already stated, namely, that the growth was confined in the cranial bones - it did not spread across the sutures.

CASE 5.

P.M. XV. 327.

E.P. aet.7 4/12, f. admitted July 31st 1900, died Sept. 14th 1900, under care of Dr. Garrod.

Has been somewhat lame in right leg for just 2 mos. and has been wasting during that time. Vomits frequently. No diarrhoea. Patient is 2nd child - other child alive. Father and Mother healthy.

C.O.A. Very thin anaemic child. Firm discrete glands are felt on both sides of neck, especially on left beneath the sterno-mastoid. Soft projecting tumour at back of lead.

HEART. Cardiac dulness slightly enlarged. Sounds normal.

LUNGS. Note good. Breath sounds normal.

ABDOMEN. Left side visibly distended by a large nodular tumour, causing bulging there and in flank. The tumour is firm, not tender

very nodular, and extends from the costal margin right down to the pelvis, without however crossing the middle line; it can just be felt on the right of the umbilicus but everywhere else is on the left side. It is only slightly moveable, does not fluctuate and is dull on percussion. Legs are very thin. K.J. present.

URINE. Acid. Trace of albumen. No deposit.

AUG. 13. Tumour is larger, more doughy, and tender. No redness of skin. Has marked squint today. No convulsions. Frequent vomiting.

OPTH. EXAM. Well marked optic neuritis, with much effusion into the retinal, and haemorrhages on and around both discs.

AUG. 15. URINE. Trace albumen.

AUG. 24. Blood exam. Hb. 50%. Red corpuscles, 2,260,000, white, 5,000.

AUG. 28. Urine contains no albumen.

AUG. 30. Drooping of left upper eyelid.

Optic neuritis marked.

SEPT. 5. Tumour on occiput is larger and softer.

SEPT. 14. Marked oedema of feet.

P.M.

HEAD. Enlarged. On removing the scalp a large soft tumour 3 x 3, was seen in the left occipital region. This had destroyed the bone and was bulging. It was soft, of a mottled purplish colour, and had a fairly well-defined edge.

It did not involve the brain, but had grown inwards causing enormous depressions over the left occipital lobe.

There was no lesion in the brain itself, but the sinuses were full of a soft spongy material which was like the substance of the growth.

There was a small secondary growth on the outside of the left orbit.

THORAX, PLEURA. Right; full of bloody serum. Right lung completely collapsed. No grwoth in lung, but secondary growth on Right 5th rib had projected into the pleura about the mid-axilla.

Left pleura contained a little serum. HEART AND PERICARDIUM shewed nil abnormal. ABDOMEN, PERITONEUM AND STOMACH natural. INTESTINES. The descending colon was adherent to the tumour, but not involved at all, and not obviously compressed. KIDNEYS. Left very large. Involved in the growth which had apparently invaded it from the pelvis of the organ. The growth here was very soft and creamy with large masses of blood effused around and in the organ. SPLEEN. Not enlarged. Quite separate from and not involved in the growth. BLADDER. Natural. UTERUS. Natural. Both ovaries were the

seat of secondary growths, the left was fairly firm, but the right was largely blood-clot.

TUMOUR. It apparently had its origin from the retroperitoneal glands, whence it had grown forwards and to the left involving everything with which it came in contact. Along with the two kidneys it weighed 4½ lbs. It was roughly egg-shaped, the upper portion being firm, and composed chiefly of glands, whilst the lower part tapered gradually away, and consisted principally of large collections of blood and clot, with soft crumbling growth. The vertebral column remained quite free. The right suprarenal was free and healthy; the left was surrounded by growth, and in one place involved.

The glands involved in the primary tumour were the retroperitoneal, the mesenteric and the glands at the kidney hilum. Secondarily the lower left tracheal glands, the right

iliac glands and the glands in the hilum of the liver were affected.

LIVER was crowded with small diffuse growths and there was a large mass in the tip of the right lobe.

Gall-bladder normal

THYROID AND THYMUS natural.

The group of right iliac glands had slightly displaced the anterior crural nerve.

Microscopical examination of the secondary growths in the liver, shewed small round cells in fairly large numbers, infiltrating among the liver cells.

The diagnosis in this case is given as:-

"Sarcoma of left kidney and
Retroperitoneal Glands;
Secondary growths in Ribs,
Skull and Glands."

The supr̈enal was found in the growth involved at one part.

The primary growth had extended into the L. kidney at its hilum, and formed a large creamy mass here. The forward spread has not been noted. Of the "backward transport" the abdominal has been well described.

(1) The Lumber glands; (2) the intestine; (3) the R. iliac set; (4) the ovaries (5) the deep lymphatic system of the liver, those at the hilus being described, and also numerous ones throughout the substance; (6) The colon groups

Then in the thorax the tracheal glands were involved, and there appears to have been no further growth in lung. The right 5th rib only was affected and the growth here had perforated the pleura, and the right pleural cavity was full of bloody serum.

The growths on the inner aspect of the cranial bones had caused enormous depression of

the brain". but it contained no growth. The venous sinuses however"contained a soft spongy material which was like the substance of the growth". This I take to have been a thrombus, which I have already pointed out occurs under these conditions.

Post Mortem VIII 57.

A.C. aet. 8 $\frac{9}{12}$ m. admitted Oct. 4th., 1887, died March 18th., 1888 under care of Dr. Money.

The head has always been large.

In May '87 the boy was struck by a stone on the forehead. Since this he has suffered from headacke, nausea and vomiting. Sleeps badly. Has always had a large abdomen. R. leg is moved with difficulty. Ecchymosis over L. eye has been there since injury. R. eye turned black 2 weeks ago. Mother thinks child does not see well.

Has had measles twice.

Father died of water on the brain, aet.32 Mother alive and healthy.

C.O.A. Child thin, colour good. Bluish tinge on L. upper and lower eyelids, and on upper R. lid. L. cervical glands enlarged, inguinal glands also, feel shotty and hard. L. side of thorax bulges more than R. On L. side of abdomen a tumour is seen, which is hard, not sensitive

and slightly movable. On percussion dulness extends in thorax along 7th L. intercostal space to spine and in front to a point 1½" within umbilicus, below to about 2" above poupart, and posteriorly to spinal columns. In front a movable band is felt extending from a point 2" to L. of umbilicus to umbilicus - seems adherent to tumour. Abdomen is tympanitic in epigastric region otherwise resonance generally diminished. Tumour does not move in inspiration, lower extremities not atrophied, when childs walks moves both legs with equal freedom.

HEART 5 Lungs normal.

OPTH. EXAM. Veins of L. fundus very tortuous. No neuritis. No haemorhages.

BLOOD EXAMINATION White to 73½ red corpuscles.

URINE A.C. 1030 no albumen.

NOVEMBER 1. Child's eye has been getting black for past weeks.

NOVEMBER 5. Urine shews trace of albumen.

NOVEMBER 9. Small round lump noticed on frontal bone outside L. external orbital angle.

NOVEMBER 15. Lump increased in size - L. eye pushed slightly forwards and downwards.

NOVEMBER 25. Redness of R. orbital plate and district swelling outside external orbital angle.

NOVEMBER 29. Apparent paralysis of L. superior rectus.

DECEMBER 1. Conguncti̇va of L. eye somewhat injected.

DECEMBER 10. Lump notices on left side of head above ear.

DECEMBER 12. L. eye much pushed out. Ecchymosus in R. upper lid.

DECEMBER 24. L. eye has been discharging for sone days.

JANUARY 3. R. eye shews slight optic neuritis.

JANUARY 17. L. eye proptosed and more or less fixed.

Cornea is a condition of interstital

suppuration, a large rounded knobby growth can be felt below upper lid.

FEBRUARY 10. Complains of pain in R. leg, and there is a swelling here about junction of middle and upper third of tibia, size of walnuts and hard. Abdominal tumour reaches anterior superior spine of ilium on R. side. Head greatly enlarged, more antero-posteriorly than laterally. Frontal and temporal veins much enlarged. R. eye much protruded. Both corneas have disappeared but R. has still remains. Apparent swelling of body of inferior maxilla and of malar bones.

Enlargement of preauricular, submaxillary and submental glands.

MARCH 2. Cannot open mouth well - floor of mouth is indurated and painful.

MARCH 13 Worse. Hands puffy especially L. Forehead is becoming more prominent at root of nose.

POST MORTEM. HEAD. On reflecting scalp, some yellow oedema was seen in neighbourhood of tumours.

The chief masses were situated in the two temporal regions, the frontal sinus over the root of the nose and one mass over the L. parietal regions - the masses were flat and lenticular in shape, of a deep red colour and varied from one to several inches in diameter; they were soft in the centre but the edges were hard, being formed by the expanded outer table of the skull.

In place where the growth was not so far advanced, the outer expanded table of bone was entire, no soft part being felt.

Beside these large masses, the whole outer surface of the skull was covered with numerous patches of a deep red colour, and the sutures in all directions, more especially the coronal, were being burst asunder by the interposition of new growth.

On removing the skull cap, the dura mater was covered with a soft new growth of a pale red colour, the inner surface of the calvarium being eaten away by the pressure of the growth.

On removing the dura mater, there were numerous soft red sarcomatous growths between that membrane and the brain, more adherent to dura than to the brain, with care, the tumour could be separated from the brain substance without tearing it, but leaving a corresponding depression in the convolutions. The masses here were also soft and lenticular in shape, and varied in size from 1 to 2 or 3 inches in diameter One large mass over L. tempero-sphenoidal lobe had caused yellow softening of the adjacent brain substance asfar as the internal capsule.

In places not encroached upon by these masses the convolutions were covered by a gelatinous looking yellow oedema, and on the two frontal lobes were a few scattered calcareous plates.

On removing the orbital plates the dura lining the orbits was found filled with blood mixed with sarcomatous elements - no vestige of the eyeballs remained.

ABDOMEN Contained no free fluid.

Almost the whole of the L. half of the abdomen was occupied by a round oblong tumour measuring about 8" in longest diameter and 5" across.

On making a section of it, the remains of the L. kidney were found at its lower end, the rest of the tumour being composed of sarcomatous tissue, which had mostly broken down into a grumous fluid, partly dark coloured, partly yellow, and at its upper portion was a mass of dark yellow material which might have represented the suprarenal capsule.

R. KIDNEY was very large, and quite natural apparently.

LIVER Somewhat anaemic, otherwise natural.

SPLEEN very large - no new growths.

STOMACH Elongated from being stretched across tumour, The Inferior vena cava was pressed upon by the tumour opposite the 3rd lumbar vertebra, here it contains no blood, but was

distended below.

MISENTERIC GLANDS of dark red colour, but not obviously enlarged.

THORAX LUNGS emphysematous all over – no new growths. L. lung much pressed on by tumour.

HEART appeared natural.

This was diagnosed as

REAL SARCOMA

In this case, no mention has been made of the glands, as seen at the autopsy, but they were affected, as during life they were noted to be enlarged in the L. cervical region.

The abdominal growth is large; situated at

upper border of L. Kidney, "and at its upper portion was a mass of dark yellow material which might have represented the suprarenal capsule", and which probably did represent its cortex.

The "backward transport" is seen through the L. cervical gland and the skull where the growths were very numerous, and as inner side had apparently perforated dura mater and caused thrombosis, followed by yellow softening of L. tempero sphenoidal lobe.

The sphenoids were also evidently involved.

The ribs are not mentioned. There was no growth elsewhere.

POST MORTEM VI, 251.

F.K. aet. 3 yrs. f. Admitted June 27th, 1884, died July 3rd, 1884. Under care of Dr. Sturges.

Quite strong as an infant. 8 mos. ago she began to lose her appetite and became languid, gradually getting pale and thin - was thirsty and hot. No vomiting until yesterday. One month ago became much worse, glands in neck enlarged, became paler and thinner. Lumps appeared on temples and scalp 2 - 3 mos. ago and have remained stationary. Walked well until 3 mos. ago, and was able to sit up until 3 weeks ago. For past month difficulty in passing urine. Has been drowsy for the last few days. Has had no infectious diseases.

Father strong, mother healthy.

3 other children - none dead - no miscarriages.

C.O.A. Extremely anaemic, cachectic, emaciated, irritable. Prefers sitting up, supporting herself with her hands. Lower extremities greatly wasted,

flaccid, with loss of all voluntary and reflex movements. No contracture. Has not complete loss of sensation. To the right of the spine of the last lumbar vertebra is a slight tumefaction - a little tender - no actual irregularity of spines of vertebra - no curvature.

Head large, blue veins on temple - swellings noticed on scalp in the parietal and temporal regions.

ABDOMEN was a little large. Bladder paralysed. Urine contains a little pus (and ? cancer cells)

LUNGS Nil abnormal.

July 1. Swelling in scalp, explored with syringe, a little white material was obtained shewing ? pus cells and fatty granular débris.

HEART. Well marked systolic bruit over whole of cardiac area.

TEMPERATURE remained between 100 and 104° during

the 5 days she was under observation.

POST MORTEM.

On reflecting tissues of scalp, several tumours at once came into view, forming bosslike excrescences covered by pericranium, thus giving them a glistening appearance. The largest one was situated over the R. side of cranium, involving nearly the whole of the parietal and encroaching on the temporal and great wing of sphenoid in front, and temporal below, and extending backwards from the external angular process of the frontal. Its most prominent part was about the situation of the parietal eminence. A nearly symmetrical swelling existed on the L. side of the Calvarium - much less prominent than that on the R. but a rather wellmarked firm tuberosity existed at the external angular of the frontal, similar to one on the R. side.

Each of these two large tumours was composed of nodose portions of marble grey and purple

colour, and on removing skull cap it was found that corresponding and exactly similar growths existed on the inner aspect, causing protuberances to about an equal degree on either side. The dura mater was tough and glistening here and apparently pushed before the growth, but nowhere invaded by it.

The growth itself was almost uniform in consistence throughout - when cut into it, in great part, resolved itself into a grumous material, streaked with lighter and darker hues of pink and red by blood. No definite stroma apparently.

THORAX. A patch of similar growth, about size of 5 shilling piece, was found on posterior aspect of manubrium sterni. It did not extend far.

RIBS. The whole of the inner aspect of the ribs presented an irregular appearance. The entire lengths of all from spinal column to cartilages were invaded by the growth which was subperiosteal, but the bony structure had also been invaded to such an extent, that fracture was easily produced.

The bulging was situated entirely on the inner aspect of the ribs, so nothing was noticed during life.

ABDOMEN. A retroperitoneal mass of growth was intimately connected with the anterior surfaces of the bodies of the vertebrae in the lumbar and upper sacral regions, also forming a thin layer over the anterior surface of the dorsal vertebrae and extended into the intervertebral foramina in most parts, especially in the lower lumbar region.

In this region it was continuous with a portion of the growth filling up the space between the vertebral arches and the theca, opposite the cauda equina, which was evidently pressed forwards against the bodies of the vertebrae. The growth, though intimately connected with the outer surface of the theca, did not invade it.

The cord had a natural appearance - not obviously softened.

Apparently separate growths invaded the iliac fossae and dorsa of the ilia, forming considerable protuberances similar to those on the cranium - entirely subperiosteal and limited by the attachment of the periosteum. Some large masses (? glands) pushed forward the aorta and vena cava, in the retroperitoneal tissues, some softer than others, mostly about size of hazel nuts,

The growth in the vertebral canal was probably an extension from those glands through the intervertebral foramina. The mesenteric glands and those about the hiluses of organs were quite natural.

LIVER - a little pale - otherwise natural.

SPLEEN - a little enlarged. No deposits.

KIDNEYS about equal in weight - 4½ ozs.

The L. contained numerous small deposits, resembling tubercles, in the cortex, arranged in groups in separate lobules, and sending prolongations

along the pyramids.

The R. contained no deposits. There was some pus in the pelvis - the calyces of which were somewhat dilated.

L. SUPRARENAL capsule was occupied by a mass of the growth, distending it so as to form a lobulated mass, with the remains of the capsule proper forming a narrow rim round it.

R. SUPRARENAL capsule quite natural.

OVARIES R. formed a globular mass of soft new growth freely moveable in peritoneal cavity.

L. quite natural.

UTERUS & BLADDER natural

STOMACH & INTESTINES quite natural

GLANDS. One large gland - invaded by soft new growth at lower part of L. side of neck - about size of cherry - other glands not obviously affected

BONES. Besides those mentioned, no others seemed to be involved.

This case was diagnosed as: -

MALIGNANT GROWTHS

ROUND CELLED SARCOMA.

Published in Transactions of Pathological Soceity of London, vol. XXVI, p. 415, where it says further -

Microscopically the growths consisted of masses of round cells, replacing the normal structure of the organs involved.

The adrenal presented a vacuolar appearance, due apparently to greatly dilated vessels, around which the round cells were grouped, whilst those further away from the vessels had undergone degenerative changes.

Here the L. suprarenal capsule was involved in the growth, the remains of the capsule proper (? cortex) forming a rim around it.

Forward growth. Lumbar glands involved, - "thin layer of growth spreading over the anterior

surface of the dorsal vertebra" (apparently Thoracic duct) - large gland at lower part L. side of neck.

"Backward transports" were (1) into spinal canal by intervertebral foramina, depressing theca but not involving it; (2) along sacral vertebrae, and apparently invading iliac fossae and the dorsa of the ilia; (3) R. ovary.

In the thorax it had occurred also, and all the ribs, and the sternum were involved.

The flat cranial bones and sphenoids were also affected.

It is stated that the L. kidney was involved, "and small deposits resembling tubercles were seen in the cortex, arranged in groups in separate lobules, and sending prolongations along the pyramids."

They may be new growths, but the kidney was dilated and contained pus, probably from pressure on ureter, and similar appearances noted in another case (10) were found on examination to be

purulent infarcts, and such I believe them to be in this instance.

CASE 8.

POST MORTEN IV 260. S.R.aet.3 $\frac{11}{12}$ yrs. F. admitted Dec. 17th 1878, died March 7th 1879, under care of Dr. Gee.

Illness commenced about 3 months ago with pains in stomach and back, no vomiting. Bowel constipated. Troublesome cough for 1 month. Losing flesh. Sleeps well. but has cramp in her L. leg at night. Eyelids have been inclined to swell. A lump has formed on head during last 6 weeks.

PREVIOUS ILLNESS. Had measles at 15 months, nothing else. Parents healthy. 5 other children healthy, 1 died at 7 months.

C.O.A. Poorly nourished. Extremely pale. A small swelling over R. parietal region - not tenden. Glands in L. neck enlarged.

HEART Nil abnormal.

CHEST No dulness. Rhonchi over both sides behind.

ABDOMEN A lump can be felt in L. iliac fossa,

movable and a little tender, probably an enlarged gland.

DECEMBER 30. Blood examination. Corpuscles diminished in quantity, but no increase of white corpuscles.

Superficial lymhatics not enlarged. Gland in L. iliac fossa, larger and tender. Abdomen a little distended, slight general tenderness.

DECEMBER 31. Extremely pallis. Eyelids somewhat swollen. Enlarged glands in L. neck, L. axilla and both groins.

JANUARY 15. No fever. Marked anaemia.

HEART Apex beat in 5th space, just outside L.N.L. Systolic murmur all over praecordium, loudest at apex,

LIVER just palpable. Spleen not felt. Lump in L. iliac fosea as before.

JANUARY 23. OPTHALMIC EXAMINATION. Disc somewhat hazy, not pale, vessels near the disc seem to be covered by a sort of skin. Yellow spot surrounded by a white circle in centre of which is

a red spot. Both eyes alike.

JANUARY 29. TEMPERATURE irregular varies between 100° and 97°

LUMP in L. iliac fossa about the same. A small lump can be felt in R. iliac fossa.

FEBRUARY 10. A few days ago L. eyelid swelled up, apparently oedema - it has disappeared now, but there is a little swelling and tenderness of L. cheek.

FEBRUARY 24. Swelling in R. parietal regions has increased enormously during last few days, and now forms a hemispherical tumour about 4" long by 2½" across. Two other smaller swellings can be felt on L. side of scalp. Veins on forehead dilated. Large tumour was incised but only thin blood came away. Blood examination shews same granular matter, but no increase of white corpuscles.

FEBRUARY 18. Yesterday she was found to be blind. Swellings in both iliac fossa are larger.

Superficial glands in groins enlarged.

FEBRUARY 20. Incision wounds on scalp have healed. Swelling over R. parietal has not altered much, that over L. has increased in size and is now about ¼ the size of the other - there is a smaller one in front of it.

FEBRUARY 26. OPTHALM. EXAMINATION. Well marked neuritis. Margins of disc very ill defined - disc swollen. Superficial vessel swollen, effusion all round and a small haemorrhage was seen, in L side.

MARCH 3. All swellings on head have increased much in size. Temporal and Infraorbital (esp L.) were dilated. Soft swelling above each zygoma most marked on L.. Glands in neck enlarged.

MARCH 5. Semiconscious. Glands under jaw enlarged and feel firm.

MARCH 7. Temperature above 102° for last few days.

L. angle of mouth distinctly drawn to L.

POST MORTEM

Emaciated child.

CRANIUM On reflecting scalp the following appearances were noticed:- A large irregular rounded swelling occupied the R. parietal bone, extending to the middle line and to within a ½" of the squamous portion of temporal bone, circular, diameter 5". On the surface it is of a deep purple colour with patches here and there more or less yellow. It presents several rounded projections on its surface and is everywhere covered by periosteum, except at 2 or 3 points punctured during life. It feels elastic, and in some places almost fluctuating. There is another tumour occupying the L. parietal eminence, it is rounded, irregular on surface, with diameter 1½". In front of it is an elongated tumour measuring 2" long by 1" broad. Besides these are many other slightly raised purple patches varying from ½" to 1½" in diameter.

The inner aspect of the skull is perforated wherever the tumours had attained any size, and an adhesion formed with the dura mater. Opposite the torcular Herophili there is a large new growth and the dura mater is adherent just at the internal occipital protuberance. At the base of the skul deposits of new growths are found in the following situations:- At the outermost portion of the posterior fossa near the basilar groove on each side; just in front of the base of the petrous portion on each side, at the most anterior and external part of the middle fossa on each side; and at the L. side of the sella turcica close to the cavernous sinus. The dura mater was adherent to the tumours in every instance, and they all presented the same naked eye characters, viz., very soft tumours into which haemorrhage had taken place.

On removing the roof of the L. orbit, the tumour sees on the L. side of the sella turcica

was found to have spread into the orbit, through the sphenoidal fissure - another small tumour is found on the outer part of this orbit. On exposing R. orbital cavity, a small tumour was found at the front part.

DURA MATER was adherent by its outer surface, but the lining membrane was entirely smooth and nowhere perforated.

BRAIN. Thrombosis of veins over posterior parts both lateral hemispheres thrombosed and contains pale, nonadherent clot. The brain feels soft at the L. praecuneus and a section here shews a tumour size of small marble, and similar in character to the other, and it is surrounded by a zone of softening.

The pia over this is dotted all over with minute red spots.

THORAX In the centre of the second piece of the sternum is a slightly raised purple patch, the size of a florin, a similar patch is observed on the inner side of the bone, and on section

the new growth is seen to pass through the bone.
RIBS On examining the inner surface of the ribs, it is seen that every rib without exception on each side has been invaded by the new growth, and shew irregular purple swellings extending from the angle to the costal cartilage. The periosteum is nowhere perforated.
PLEURA Some recent lymph over lower lobe of R. lung and a little turbid fluid here.
HEART and pericardium natural.
LUNGS Rather pale and in part emphysematous. Bronchial glands not enlarged.
ABDOMEN Liver is of natural size and consistence.
SPLEEN natural.
KIDNEYS natural. Suprarenals natural. In L. lumbar region beneath suprarenal body is found a greyish white firm body, the size of a small walnut, one section having a fibrous aspect, no haemorhages into it.

In the R. iliac fossa, lying against the brim of the pelvis is a gland the size of a

big marble, purple externally, very soft, on section exuding a brick red juice, which seems to be composed almost entirely of epithelial cells, undergoing a granular change.

In the L. iliac fossa starting from the brim of the pelvis a chain of lymphatic glands can be traced up to a level with the 2nd lumbar vertebra, all infiltrated with the new growth, and presenting similar characters to that just described.

This was diagnosed as:-

"DISSEMINATED SOFT CANCER"

In this case the suprarenals are said to be "natural", but in R. lumbar regions beneath suprarenal was a small firm tumour. Here again the

apparently natural L. suprarenal was only the cortex of that body.

The forward spread is not well defined in the notes. The lumbar glands seem to have been involved - no mention of thoracic path, but there is no mention in Post Mortem notes of cervical glands, and clinically these were noticed to be large and grew very much whilst in hospital.

"Backward transport" (1) into R. iliac fossa; (2) chain from 2nd lumbar vertebra to brim of pelvis.

In thorax - all the ribs, and in 2nd piece of sternum.

Cranial bones shewed numerous growths, and here the spread along inner aspect of the base of the skull, observed by myself in Case 1, is beautifully described.

The sphenoid was also affected.

Here again there was thrombosis of some of the

posterior cerebral veins followed by softening of the corresponding portions of the cerebral cortex.

CASE 9.

POST MORTEM III, 165.

J.L. aet. 5, m., Admitted july 4, 1873, died July 19, 1873, under care of Dr. West.

History of tubercle in Mother's family, and paralysis in Father's. No family history of tumours.

Has squinted since he was a baby. Began to get easily tired about 7 months ago. About a month ago, whilst playing he was noticed to drag his R. leg, and 2 - 3 days later was unable to raise R. hand to mouth. One week later unable to walk, but can move legs, when in bed.

Has gradually gained power in R. arm. Complains of pains in ears sometimes, but has no discharge.

Frontal headache for past 7 months.

No vomiting.

Six weeks ago, L. side of chest was noticed to bulge a little - it has gradually increased in size - no pain. Shortness of breath lately.

Eyes swollen for one month, and head has become larger lately.

C.O.A. Fairly nourished child. Complexion palid yellow; large head (circumference 22½" and 12½" from ear to ear). Both eyeballs prominent, the L. more so.

Pupils equal, active.

Complains of pain in forehead. Forehead is prominent, superficial veins over it are also prominent. Grasp of hands fairly good and equally so. Walks with legs wide apart.

OPHTHALM. EXAMINATION. L. disc enlarged, outline indistinct, vessel contracted.

R. disc enlarged, outline indistinct, there is a patch of extravasation sixe of pin's head by the side of the vessel.

Vessels small.

There is R. facial paralysis.

Tongue protruded towards R.

CHEST. On L. side in front there is a pearshaped

swelling 2½" x 2", base downwards, apex upwards, sharply defined below, shading off gradually above. Bordered on R. by sternum, which is partly raised, it occupies lower part of L. chest.

Skin freely moveable over it, it is of a yellowish green colour, and prominent superficial veins course over the surface. The tumour is dense and hard, anterior part formed by projected ribs - does not pulsate. Percussion - dull over tumour.

Heart's apex not displaced. A bruit heard with 1st sound at apex.

CHEST Note impaired over L. base - air entry good.

No abdominal sounds.

ABDOMEN distended, tympanitic, no fluctuation

LIVER enlarged, surface smooth, reaches 2/3 of distance between umbilicus and ensiform

SPLEEN enlarged, surface smooth, reaches below umbilicus.

URINE Sp. gr. 1010. No albumen. Phosphates.

BLOOD No increase in white blood corpuscles.

July 19. L. eyelid protruded, discoloured.

Vomited his dinner with blood and died.

POST MORTEM.

BRAIN. Anaemic, not softened - contained no tumour.

CRANIUM Exceedingly soft. The inner surface was almost completely covered with spiculae of bone, some of which adhered to the dura mater on the cranium being removed.

Sphenoid bone exceedingly soft, adhering to and growing from it was cancerous material of a yellow colour, which passed forwards into the L. orbit, causing protrusion of L. eyeball

STERNUM. When the skin was dissected off, the surface of the protruded sternum was a purple red colour. On removing the sternum cancerous material was found growing on its posterior surface, causing its protrusion forwards.

This material continued for some distance laterally on the inner surface of the L. 2nd and 3rd. ribs and their interspaces. It was hard to cut like cheese and was light yellow in colour.

LUNGS. No fluid in pleura. No adhesions. Lungs normal. Contained no growth.

HEART. L. ventricle hypertrophied, valves normal.

LIVER enlarged. Cancerous material scattered through substance, apparently round intralobular veins, of a pink colour varying from size of a pea, to that of a threepenny piece.

SPLEEN. Enlarged, firm. No deposit visible.

KIDNEYS. Much enlarged. Mottled, red and white.

INTESTINES. Normal.

GLANDS. Mesenteric - one or two enlarged and cancerous, the rest slightly enlarged and congested. Bronchial - a little enlarged and congested.

Diagnosis given as: -

MALIGNANT DISEASE OF CRANIUM, STERNUM LIVER AND KIDNEYS.

Of the primary growth we have little indication, but the other facts would seem to indicate that it must have been present.

It does say, however, that the mesenteric glands were slightly enlarged and congested and one or two were cancerous.

Then the kidneys were enlarged and mottled red and white, and thought to be the seat of malignant disease. The bronchial glands were enlarged and congested.

"Bachward transport" seen in Liver, where the deep lymphatic veins were involved.

In thorax L. 2nd and 3rd ribs and large growth in sternum.

In cranium - flat bones and sphenoid.

P.M. II, 295. CASE 10.

F. H. aet. 10, m. admitted Aug. 18, 1869, died Jan. 28, 1870., under care of Dr. Dickinson.

Good health until 8 mos. ago when he fell on a chair and injured his left side. This was followed by pain, but no bruise. Since then never well - languid; has occasional shooting pains in left thigh. No vomiting. Three mos. ago was in St. George's Hospital, when a tumour was felt in left side abdomen (thought to be spleen), which descended in inspiration. It has gradually increased in size. Has had spontaneous epistaxis. Father d. enteric fever. Mother healthy. 5 other children alive and healthy. 3 dead (cholera; pneumonia; scarletina). Patient has had Wh.C. and measles.

C.O.A. Well-formed, well-nourished. Not anaemic. Some dulness on percussion at right

apex. Heart.- Sounds good.

ABDOMEN. A large irregular tumour in belly occupying left lumbar region, extending into umbilical. Above it reaches to 6th rib, and extends to below umbilicus; laterally it goes backwards to spine and forwards to umbilicus.

Blood appears natural under microscope.

SEPT. 8. Tumour unchanged. Superficial abdominal veins are large and distinct.

SEPT. 14. Tumour is increasing in size.

OCT. 9. Complains of soreness in left foot and ankle.

OCT. 10. Left leg paralysed, and pain persists.

OCT. 22. Pain in right leg - in calf and sole of foot. No spine disease discovered on careful examination. Has involuntary micturition.

OCT. 27. Involuntary defaecation last night. Incontinence of urine continues.

OCT. 29. Pain in left leg, not in right. Incontinence of faeces and urine persists.

Urine contains phosphates, no alb.

OCT. 30. Tumour was found to fluctuate in left loin and was tapped - a little bloody fluid obtained shewing a lot of molecular and globular fat under microscope, and exudation cells. Moves his right leg, but left is paralysed.

NOV. 5. Can control defaecation.

NOV. 20. Tapped again. Some hyaline fluid obtained, shewing large round cancer-cells with large oval nuclei, brought better into view by acetic acid.

DEC. 2. Urine alk: slight trace alb. - pus.

DEC. 17. Pains in left leg.

The tumour is increasing rapidly in size and is red and tender on surface. Superficial veins are enlarged.

DEC. 22. Small vertical incision into tumour, behind in left loin. Mixed blood and pus evacuated, not a trace of cancer cells.

DEC. 24. 2 lumps on calvaria, 1 at left frontal

region over eyebrow, the other over left occipital region; with no bruise and no pain.
JAN.1. Some strabismus of left eye, sometimes external, sometimes internal. Both discs and retina are normal. No pain now in either leg.
JAN. 6. Deep-seated, throbbing, pain in left temporal region. Squint persists. Pupils equal. No facial paralysis. Sight good. No pain in paralysed leg.
JAN. 24. Gradually sinking. No pain.
P.M.

Much swelling and redness of left eyelid, continuous with the left frontal lump; that at left occiput very distinct. No nodes on any other bones.
HEART. Healthy.
PLEURA. Left healthy.

Right had firm adhesions at apex in front and at side; on breaking them down a large cavity was broken into, which was

situated in the lung, and contained a lot of whitish-yellow flaky, membrane-like, hardened pus. It was folded on itself, so that, when laid flat, it covered a considerable area. The walls of the cavity were hardened and thickened - no tubes were seen opening into it.
BRONCHIAL GLANDS, mesenteric glands and peritoneum were healthy.
LIVER. At front of left lobe was a small patch of fibrous tissue, radiating from a centre; apparently indicative of an old local inflammation - it did not affect the tissue of the liver.
SPLEEN healthy.
KIDNEYS. Right healthy.

Left contained in its pelvis, some turbid yellowish, purulent fluid, and on the surface were mottled areas due to peripheral suppuration. Capsule stripped easily. The left ureter, passing over the tumour mass, was probably compressed by it.

THE TUMOUR was situated entirely behind the peritoneum. It was most prominent in the left lumbar region, but also extended into the left iliac region over the psoas and iliacus muscles, and into the umbilical, crossing the spine in a direction downwards and forwards towards the right iliac region; finally it passed up into the left hypochondriac region, pushing up somewhat the Spleen and left kidney, the latter lying on the upper surface of the tumour in a horizontal position, its lower extremity being directed straight forwards. It was nodulated on the surface, and to a great extent made up of distinct glandular masses.

It appeared to involve the lumbar glands, but had so infiltrated the parts behind and at the sides, that it was impossible to see what really formed its base.

The lowermost lumbar vertebrae were

softer perhaps than usual, and although it could not be seen that the cancer extended into the spinal canal, yet it bore up close against the intervertebral foramina, and may have exerted pressure on the dura mater of the cord.

The descending colon passed vertically down in front of the tumour, forming the margin of the palpation area, and resting on the outer part of the tumour.

CALVARIA. Deposit of cancer at site of lungs. It extended right through the bone, and affected the dura mater on its adjacent surface; though the dura mater of the front lungs was much affected on its external face, yet at the occipital lung, it was but little affected. Round the margin of the orbit, it had extended into the orbital cavity, as was seen on the removal of the orbital plate of the frontal bone - it had not effected the eyeball.

This was diagnosed as:-

Carcinoma of Lumbar Glands.

In this case tumour was in left lumbar region and was not in kidney, so probably left suprarenal.

Tumour large, and appears to have exerted pressure on cord through intervertebral foramina.

Forward spread. Lumbar glands involved, others not mentioned. "Backward transport" ? Liver.

In Thorax. Right apex of lung may have been affected, but very doubtful. In cranium - occipital bone and sphenoid appear to have been the chief ones affected.

It is interesting that in this case the left ureter was pressed upon, causing dilatation of the pelvis, and suppuration in the cortex.

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In addition to those 10 cases taken from the records of the Hospital for Sick Children, Gt. Ormond Street, I have been able to find 11 others in the literature in which the left suprarenal was the seat of the primary growth, and these I have abstracted and set out in the form of a table along with my own cases.

T A B L E.

INCLUDING CASES TAKEN FROM THE LITERATURE.

An analysis of this table yields the most striking results, which becomes even more remarkable when compared with the analysis of the series of cases in which the primary growth has originated in the right suprarenal medulla.

Of those 21 cases, in 17 the spread had extended as far as the cranium, and in but 4 cases there was no growth in that region - and those 4 comprise the youngest infants in the series. Unfortunately in Case 18 the age has not been given, but here the extension had got the length of the 3rd cervical vertebra which it had involved.

But in the youngest case of all Nos 19, 20, and 21, where the ages were 2, 5 and 6 weeks, the spread has only taken place along the nearest set of lymphatics, that is to say, by backward transport to the liver.

If as I believe, the appearances observed after death all point to the spread from the

left suprarenal medulla taking place along the Thoracic duct and its tributaries, how much the more so does this become evident, if to the fact so ascertained, we add those observed during life.

EXOPHTHALMOS. In 8 of the cases (Nos 7, 10, 14 16, 18, 19, 20 and 21) there was apparently none. In 6 cases both eyes were proptosed and 5 of those (Nos 2, 3, 6 9 and 13) it is stated that the LEFT EYE was first affected, whilst in one (No 11) the order of involvement is not stated. In 5 cases (Nos 4,5, 8, 12 and 15) the LEFT EYE only was affected.

And in only 2 cases was the Right eye first affected, and in one of those (No 17) both suprarenals were involved. In No 1 however the proptosis had definitely occurred first in the Right eye.

Cervical Glands.

This was another point that might have been observed during life, but only appears to have

been in 5 cases; the result being that in 4 of those(cases 2, 5, 6, and 8) the Left cervical set were the first to become enlarged, whilst in one other case (No 3) both sides of neck had the glands swollen, but apparently more marked on Right side.

In case 1 however, the glands on the Left side of the neck were larger than those on the Right, as seen on autopsy.

As I have said, to realize the full significance of these facts, they must be compared with those given at the end of the series in which the Right suprarenal was involved.

DISSEMINATION WHEN THE PRIMARY GROWTH IS IN THE RIGHT SUPRARENAL MEDULLA.

This I believe takes place along the Right Lymphatic duct. The anatomical evidence which lends colour to this view, I have already stated, and shall now proceed to give my pathological findings, and the cases not already published.

Before doing so, however, I should like to draw attention to the distribution of the Right Lymphatic duct, which has been taken from the same authorities as the Thoracic duct.

The Right Lymphatic duct "is a short vessel, from ¼" to ½" in length, which receives the lymph from the absorbents on the right side of the head and neck, the right upper limb, the right lung and right half of heart, the right side of the diaphragm, and part of the upper surface of the liver. The latter

comprise those from the adjacent part of the right and left lobes on their parietal surface, and these pass up in the falciform ligament and pierce the diaphragm to reach the anterior mediastinal glands, and end finally in the Right Lymphatic duct."

Towards the middle line, anastomoses will occur between those tributaries, and the ones belonging to the Thoracic duct, and at those parts, viz. in the thoracic and head and neck, we would occasionally find the spread occurring into parts of the opposite tributaries.

CASES

The following case is taken from the Hospital records, and the spread here has reached the cranium.

CASE 22.

M.I. aet. 2½ yrs.m.Admitted Sept. 7th, 1905, died Sept. 29, 1905., under care of Dr. Garrod.

Lumps on head first noticed 5 mos. ago, and have become larger since. No other complaint No previous illness.

One other child 6/12 yrs. old - healthy. C.O.A. Very anaemic. On right side of forehead is a lump, size of walnut, containing fluid. Skin over it not ulcerated or tender. Two other smaller fluctuating areas on left temporal fossa. Several hard glands to be felt in suboccipital region and around mastoid process.

Running down each side of face is a dilated wellmarked vein.

ABDOMEN. Liver. Enlarged, hard.

Spleen 3 f.b. below cost. marg., very hard.

CHEST. Nil abnormal.

BLOOD EXAM. Red corpuscles 1,400,000, white 8,800. One of the swellings on head was aspirated and pure blood only obtained. Ecchymoses appeared on right conjunctiva. Lumps on head bigger.

Sept. 7. Transferred from Surgical to Medical ward. Patient is very cachectic. Chain of enlarged glands at posterior edge of sterno-mastoid on both sides, not very hard. Has had suboccipital glands and hard enlarged glands in groin.

On left side of head is a soft swelling, about 4" x 2" - reaching from external angle of orbit back over parietal region.

Over right eye on forehead is a round soft swelling about 2" x 2".

At external angle of right orbit is a small lump, protruding over conjunctiva.

Ecchymosis of right conjunctiva -

orbital and palpebral.

The swellings are sharply defined from the bone; they are soft and appear to contain fluid. No tenderness.

HEART. Heart slightly enlarged. Systolic murmur heard all over cardiac area - first sound is loud at apex.

LUNGS. Nil abnormal.

ABDOMINAL. Liver felt 3 f.b. below cost. marg. Spleen 2 f.b. - very hard.

Sept. 12. The ecchymosis over right upper and lower eyelid is very much increased. The eye is almost closed. Child does not seem to have pain.

Sept. 18th. Lumps still increasing.

Sept. 19. Ecchymosis lessened over right eye. Left eye is protruded rather more.

Temperature between 98° and 100°, raising to 102.6° shortly before death.

BLOOD EXAM.

CASE 22.

	SEPT. 11th
Haemoglobin	45%.
Erythrocytes	1,572,000
Colour Index	1.6
Leucocytes	14,500
Differential Count	
Polymorphonuclears	39%
Large Mononuclears	2.5%
Small Lymphocytes	42%
Large "	13.5%
Eosinophiles	1.5%
Myelocytes	1.5%.
	No nucleated Reds seen.
	Some poikilocytosis.

P.M.

HEAD. On removing the scalp, the calvarium was seen to be the site of large masses of growth, originating in the bone. They were dark-red in colour, soft, spongy and engorged with blood.

From the inner aspect, the dura was seen to be bulged irregularly by rounded masses, so me as large as a closed fist. The dura itself, although tightly stretched over the masses was not invaded by it, but shewed many points of capillary haemorrhage on its surface. The base of the skull was also the site of new growth, but less so than the vertex. One definite mass originated in the basi-sphenoid and filled up the sella turcica . Another filled up the left orbit.

The right orbit also contained growth - but less than the left - on this side, however, recent haemorrhage had taken place.

The Brain was altered in shape by the bosses of growth, but otherwise appeared quite natural.

NECK. Large glands were present on both sides, especially on the right. These were soft, almost fluctuant and beefy, closely resembling the cranial growths.

TONSILS. Thyroid and Thymus appeared natural.

THORAX. Lungs and Pleura were normal - no secondary growths.

PERICARDIUM. Visceral layer was studded with petechial haemorrhages - no growth.

HEART. Cavities dilated. Valves normal.

ABDOMEN. Peritoneum normal.

LIVER. Large, slightly fatty. A few secondary nodules of growth seen, the largest about size of head of bonnet-pin.

SPLEEN. Large, firm. No growth.

KIDNEYS. Both pale, but apparently free from growths.

R. SUPRARENAL, was the sight of new growth, resembling that in the skull. The tumour was about the size of a shelled walnut and projecting from its upper aspect was a thin fringe of apparently normal adrenal. On section it showed a central circular area of greyer and firmer growth - probably of greater age.

L. SUPRARENAL. Normal.

PELVIC ORGANS. Normal.

A gland was enlarged near the pelvis of the right kidney, about as large as a marble and contained new growth. Other glands shewed no obvious change.

HISTOLOGICALLY. Primary round celled and oval celled sarcoma of the suprarenal.

In this case the primary growth was small and was situated in the Right Suprarenal -

"a fringe of apparently normal adrenal " (probably cortex) was seen adherent to it.

Forward transport, which is seen in such cases, as a chain running along the upper surface of the diaphragm beneath the pleura to join the anterior mediastinal glands, is not mentioned, but unless specially looked for would not be noticed.

"Backward transport" has caused secondary growths on the liver, and along the cervical glands to the skull where the spread along the inner aspect of the base has been pointed out.

Observe that the ribs were not affected.

I think it convenient to introduce at this place, the other 5 cases I have found in the literature in which the primary growth was in the right suprarenal, and where there were in addition secondary growths in the skull.

T A B L E

INCLUDING CASES TAKEN FROM THE LITERATURE.

I introduce an analysis of this table here, because it offers such a marked contrast to the one given at the end of the other group.

The similarity of the cases here to one another is evident - in only one did secondary growths occur in the ribs (probably through an anastomosis with terminals of the thoracic duct. In 4, secondary growths occurred in liver.

But the evidence obtained during life is remarkable.

EXOPHTHALMOS In one case both were affected, when the case came under observation (No. 27), but in the other 5, the Right eye was proptosed (In No. 22 the L. became so later.)

GLANDS

In 4 of the cases, (Nos. 22, 23, 24, and 26) the cervical glands were noticed to be enlarged, and in two of those the Right cervical glands have been especially drawn attention to.

I think those facts speak for themselves.

In none of the remaining cases of carcinoma with primary growth in the Right suprarenal was these spread to the cranial bones, though there was I believe evidence of spread along the Right Lymphatic duct in many of them.

The first two cases, are ones on which I performed the autopsy, and the first one I also observed during life.

CASE 28.

POST MORTEM XXIII. 50.

F.W. aet. 3 4/12 years, m. Admitted Feb. 24, 1910: died April 13th, 1910. Under care of Dr. Colman.

On Feb. 10th complained of pain in R. side of abdomen, and this persisted for a week.

On Feb. 17th abdomen was noticed to be swollen and hard on the R. side. Has been wasting during this time.

Patient is youngest of 4 children, of which one died at birth - others healthy.

Both parents alive and healthy.

C.O.A. Pale, thin child. Complains of pain in R. hypochondrium. No glandular enlargement. Bones appear normal knee jerks present.

ABDOMEN. Large, full and tense. Circumference $21\frac{3}{4}$" at a point 2" above umbilicus.

Large prominent veins over R. side of abdomen. On palpation a large mass is felt, mostly on the R. side, with a sharply defined lower border, com-

mencing at costal margin in L.N.L. and running obliquely downwards and to the R. to the R. ant. sp. iliac spine. About the middle of this border a definite notch is felt, and the edge is firm. Percussion extends all over the area and upwards to the 4th space in the R.N.L. At the lower part of this sharp border on the R. side, a smaller deeper, rounded mass can be felt.

Posteriorly the dulness extends from the R. iliac crest to 2" below the angle of the scapula.

LUNGS. Note good. Brth. sds, normal. No accomp.

HEART. Not enlarged. Systolic murmur at base.

March 1. Tumour is increasing in size. At region of notch in lower border, a soft cystic swelling is felt - freely moveable.

March 14. Bloodpressure 98 mm. Hg.

" 16 No pigmentation. Few small glands in both axillae and anterior cervical triangles.

Slight oedema of both feet - more marked on R. side.

ABDOMEN. Increasing rapidly in size. Circumference 24" at point 1" above umbilicus. Veins very dilated over middle and R. side abdomen in front, and over both sides behind. Tumour now visible in all R. and middle divisions of abdomen, most prominent in epigastric and umbilical regions. Does not move with respiration. Softer than before. Surface smooth. Not tender. Skin moveable over it, but tightly stretched, dulness over whole mass, but resonance in other parts of abdomen.

LUNGS. Dulness over R. base behind - Brth. sds. faint. V.R. diminished. No accomp.

URINE. Acid 1010. No albumen. Microscop. urates only.

March 25. Wasting rapidly. Tumour still increasing in size, but otherwise no change.

BLOOD EXAM. CASE 28

	FEB. 25th	APRIL 4th
Haemoglobin		42%
Erythrocytes		2,310,000
Colour Index		1
Leucocytes	25,000	12,000
Differential Count		
Polymorphonuclears	81%	74%
Large Mononuclears	4%	4%
Small Lymphocytes	5.5%	14.4%
Large "	8.5%	6.6%
Myelocytes	1%	.6%
Eosinophiles		.4%
		1 nucleated Red seen.
		Some chromatophilic changes.

April 4. Much weaker. Oedema R. foot more marked. L. also oedematous. T. occasionally reaches 100°, but usually normal. Urine shews nil abnormal.

April 13. Had been getting much weaker, but death occurred suddenly.

POST MORTEM.

HEAD Scalp and cranial bones normal. Brain normal.

NECK. One or two small haemorrhagic glands just above the R. clavicle at the junction of the R. Subclavian and Internal Jugular veins

THORAX. Bifurcation gland not enlarged. Some slightly enlarged glands along both main bronchi. On upper surface of diaphragm of R. side situated beneath the pleura were several large glands, becoming larger as they passed towards middle line. In addition there were several paler, discrete nodules of new growth on upper surface of R. side

of diaphragm. None on L. side.

PLEURA. Healthy. Cavities contained no fluid.

LUNGS. A small ivory-coloured, circular nodule, about size of pea, was seen in apex of R. lower lobe, just under pleura. A similarly situated nodule, of about the same size was present at apex of L. upper lobe.

On section several smaller nodules, similar in appearance were seen in R. lower lobe in relation to the bronchi.

HEART & PERICARDIUM: normal.

ABDOMEN. Several pints of clear ambercoloured fluid in peritoneal cavity. Abdominal wall healthy.

The liver was greatly enlarged and the lower border extended right across abdomen, about the level of the umbilicus. The gall-bladder was distended and situated in the L.N.L.

THE TUMOUR - situated below the liver, but tightly

applied to it, and chiefly on the R. side was a large rounded reddish mass of new growth, covered by peritoneum, and below this was a lump of affected glands, about as large as the closed fist, situated in the omentum. The Stomach and Intestines were considerably displaced, but not involved. The spleen was pushed upwards and backwards and was unaffected.

The tumour had pressed the liver over it like a cap, so that that organ was only apparently increased in size, being in reality flattened out over the round upper surface of the tumour to which it was closely applied but not attached.

LIVER. Much thinned out by tumour. On its posterior surface, where it was uncovered by peritoneum there were numerous small, pale, ivory-coloured areas of new growth, extending slightly into substance, and also several under capsule in this neighbourhood. (Seen in painting)

On section the nodules could be seen extending

slightly into the substance, and the sharp demarcation between liver and tumour was well seen.

The mass of new growth on section was found to be very soft and semidiffluent in centre, firmer towards edges, and here it was ivory white in colour, while in centre it shewed all shades between red and white, due to haemorrhage.

It was surrounded by a fairly firm fibrous capsule in addition to the peritoneal covering. The R. kidney and suprarenal could not be found.

L. KIDNEY Not increased in size. Capsule stripped easily. Substance normal in appearance.

L. SUPRARENAL was normal in position and appearance.

BLADDER Unaffected.

THE AORTA & VENA CAVA ran downwards behind the mass, the latter was much compressed, but in neither was the vessel wall affected.

MICROSCOPICAL SECTIONS.

1. The tumour consisted of large masses of cells with rounded, deeply staining nuclei, and small amount of protoplasm, and running between those were small strands of fibrous trabeculae.

At parts areas of extravesated blood corpuscles were seen.

2. In the Liver, a nodule of similar cells was found, and in the midst of it, were seen the branch of the hepatic artery and the portal vein. The liver tissue surrounding it had been compressed, the cells being flattened out, but no tumour cells passed between them.

3. In the lung a small nodule, just under the pleural surface was examined. Numerous formed bloodvessels passed through this nodule, containing only blood corpuscles. The cells of the tumour were similar to those found elsewhere.

4. One of the enlarged lymphatic glands shewed bundles of fibrous trabeculae enclosing similar cells. Some extravasated blood corpuscles seen here also.

Growths of the suprarenal medulla have two modes of spread (1) by direct extension, and (2) by the lymphatics. The latter mode is the one we have chiefly noticed so far, but in some of the cases, and especially in those where the primary growth is in the R. suprarenal medulla, the former is often well marked. This may be accounted for partly from the fact that the growth occurring in the R. suprarenal medulla almost uniformly attains a larger size than one starting on the L. side.

As a result of this direct extension, perhaps assisted by a lymphatic connection, the growth very often affects the kidney, and does so in a very definite way, well seen in some of the cases which have not progressed too far. It passes in

by the hilus of the kidney and when it reaches the pelvis, increase in size occurs, and the kidney substance becomes spread out over it, so that in early cases it can be stripped off from the tumour, but latterly it becomes greatly thinned out and probably becomes atrophied. In the early stages, however, the kidney thus invaded, retains its characteristic form whilst enlarging.

Such probably was the spread in this case, but this is an advanced one.

The lymphatics affected in this case are exactly those we should have expected to find involved. We have: -

(1) Direct forward spread in the glands on the upper surface of the R. side of diaphragm, and at the point where the R. Lymphatic duct ends.

(2) "Backward Transport" accounts for the nodules on the liver, and those in the bronchial glands.

The next case was in a surgical ward, and I did not see it during life, but I made the post mortem examination of it.

CASE 29.

POST MORTEM XXII 296.

M.T. aet 6 years, F. admitted Sept. 9th.,1909. Died Oct. 29th., 1909, under care of Mr. Arbuthnot Lane.

Lump in abdomen noticed 6 weeks ago, has been getting larger. Has been very constipated. Takes food well.

C.O.A. Pale, flabby child.

ABDOMEN Firm hard tumour, filling lower abdomen up to umbilicus and going back into L. loin. Some hard glands felt moving over it. Tumour dull, movable, adherent to abdominal wall just above umbilicus.

Colour not made out.

Axillary and intercostal glands enlarged.

Sept. 10 Operation - Mr. Lane. Large retroperitoneal sarcoma found, glands large in omentum. Nothing done.

Sept. 18. Wound open, and coils of small bowel protruding. Resutured.

Oct. 15. Abdomen has gradually increased in size, and child has become markedly emaciated.

POST MORTEM.

HEAD. BRAIN Somewhat oedematous.

THORAX Bifurcation gland not enlarged.

PLEURA Nil

LUNGS Congestion at both bases. No new growth.

HEART Not dilated, valves normal.

ABDOMEN Several pints of clear, amber-coloured fluid in peritoneal cavity.

Between the parietal peritoneum and the muscular layer of the abdominal walls was a layer of soft salmon-coloured new growth, varying in thickness from ½" to 1" at different parts, but extending right round to and being continuous with the posterior retroperitoneal growth.

Situated on the posterior wall, on both sides of the vertebral columns, rather more on the L. than the R. was a large rounded mass of

soft salmon-coloured new growth. It extended upwards to the Liver and Spleen, but these could be easily separated from it. The stomach was anterior to it, and was not involved. The coils of intestine lay across it, attached to, and in some places embedded in it, but could easily be separated from it.

The mass extended downwards into the true pelvis, it was not attached to the bladder, but the uterus and tubes were embedded in it.

The kidneys were closely applied to, and partly surrounded by the mass, but could be separated off.

The mass was firmly fixed and immovable on palpation.

On cutting across the tumour a similar soft, semidiffluent consistency was found throughout except for one or two areas of caseation in the centre. At several points there were haemorhages into the substance. The whole mass was about

twice the size of the child's head.

LIVER A large mass, continuous with the tumour was situated in the hilum, but was easily stripped off. Several small secondary nodules were seen on the surface, not elevated however, and extending downwards for a short distance into the liver substance.

SPLEEN Pushed upwards and backwards.

No secondary growths here.

KIDNEYS L. 3-4 times normal size, soft. Capsule not adherent. Surface smooth, but somewhat irregular and areas of pallor were visible.

On section the pelvis was greatly dilated, and contained a large mixed blood clot. L. ureter was dilated and embedded in mass. R. was about same size as L. capsule stripped easily. Surface smooth. On section - cortex somewhat thinned out, but not so much as on L. side. Pelvis greatly dilated and contained urine.

Ureter imbedded in mass and dilated.

SUPRARENALS. L. was healthy and was easily removed. R. was applied closely to growth, and attached to it. After hardening, a section was made, and it was seen that the mass was in connection with the medulla, simply the cortex being applied to its surface. (Painting shewn)

PANCREAS Imbedded in growth, but easily separated off and was healthy apparently on section.

STOMACH and INTESTINES - unaffected.

INTESTINE GLANDS. Not involved. Some retroperitoneal glands were seen, shewing secondary growth.

BONES unaffected.

HISTOLOGY.

Sections of growth shewed small round and oval cells similar to those found in cases 1 and 2.

L. kidney contained no secondary growth.

Liver shewed rounded collection of similar cells under capsule.

Portion of cortex of R. seprarenal was cut and appeared normal.

In this case the growth has remained fairly well localized, though it shews a little "backward transport".

The mass has compressed the portal veins and ureters; accounting for the ascites and dilatations of the kidney and pelves.

An interesting direct spread, aided probably by lymphatics has occurred, following round parietal peritoneum to anterior abdominal wall. This spread is also seen in Case 37 and 39.

Backward spread is seen in the nodules on the surface of the liver.

The remaining 11 cases are also taken from the hospital records and are given in full, as they have not previously been reported.

CASE 30.

P.M. XVII, 94.

R.P. aet. 2 3/12, m. Admitted April 2, '03, died April 2, '03, under care of Dr. Lees.

Well until 3 wks ago when child became pale and irritable. Abdomen always had been prominent, but on March 21st enlargement became visibly greater. A tumour developed on right side which was at first hard, but latterly softer. Urine appeared normal.

C.O.A. Very ill. Great distention of abdomen In right half of abdomen, a large tumour felt - shape of kidney. Small lump on right 8th rib in posterior axillary line. Haemorrhage about right nipple. Died a few hours after admission.

P.M. Well developed child. Haemorrhage into muscular and subcutaneous tissues in region of right nipple.

ABDOMEN. Large tumour in right side of abdomen. Tumour was dark and of soft pultaceous consistence. Above, it was intimately connected with lower surface of liver (which it infiltrated) and below, it reached into pelvis. Origin of tumour could not be made out.

The right kidney was found in the tumour mass; on section it appeared healthy, though small, and the growth was apparently beginning to infiltrate the outer aspect of its posterior wall. The right suprarenal capsule was not found. The Gall-bladder, Spleen, and left kidney were not involved.

The intestines on the right side of the abdomen were involved in the mass. Behind the tumour had grown upwards and infiltrated the diaphragm.

THORAX. Masses of new growth seen on pleural surface of diaphragm on the right side.

Heart and Lungs healthy and bronchial glands not enlarged.

On right 8th rib in posterior axillary line there was situated a small subcutaneous secondary nodule.

Section of growth - Round-celled sarcoma.

This case was diagnosed as:-

"Abdominal Sarcoma."

Here the forward lymphatic spread is seen on the pleural surface of the right side of the diaphragm. "Backward transport" may have involved Liver, but appears more likely to have been by direct extension.

It is also difficult to say whether the 8th rib has been involved or whether it is a subcutaneous nodule situated over it.

CASE 31.

P.M. XVI, 48.

W.B. aet. 1½ yrs. f. Admitted Oct. 22, 1900, died March 12, 1901, under care of Dr. Voelcker.

Child had previously been in this Hospital on July 23, 1900, with a swelling filling up right side of abdomen, which had first been noticed 6 mos. previously and was discharged with whooping cough. Readmitted Oct. 22nd 1900.

C.O.A. Flabby, anaemic child.

ABDOMEN. Large smooth swelling occupying right side from hypochondrium into right iliac region, with a definite border towards middle line. The swelling has a smooth surface, no areas of softening, no thrill on palpation, resonance dull, no tenderness.

URINE. 1025 acid. Contains pus, blood and albumen. No casts.

Liver is 1 f.b. below cost. marg.

Nov. 20. Mr. Lane opened the loin and removed the tumour. It was a large soft white mass in connection with the right kidney which was partially destroyed by the growth.

Jan. 2. Abdominal wound healed.

Feb. 18. Tumour rapidly increasing. Died in a paroxysm of coughing.

P.M.

HEAD, BRAIN. Meninges and sinuses natural. Large, soft sarcomatous gland at root of neck on left side, partially displacing Larynx, Trachea and Oesophagus to right.

THORAX, PLEURA. Both filled with a turbid fluid which was probably not purulent.

LUNGS. Largely occupied by patches of new growth; these were especially noticeable in the apex of both lower lobes and in the right upper lobe. The pleura over these tumours was injected, but not roughened.

HEART AND PERICARDIUM natural.

ABDOMEN. The peritoneal cavity was filled with a turbid fluid which contained small blood clots.

STOMACH AND INTESTINES normal.

LIVER contained a few small growths, chiefly in the right lobe. Gall-bladder normal.

PANCREAS natural.

SUPRARENAL. Left natural. Right not seen.

L. KIDNEY. Larger than normal.. No growths in substance though the tumour surrounded it.

SPLEEN natural. No growth.

TUMOUR. The growth itself was a large soft white tumour, attached to the scar of the former operation, and lying wholly behind the peritoneum. It occupied the whole right iliac fossa, the front of the spinal column, and stretched over the left kidney, and down into the brim of the pelvis.

The duodenum was stretched tightly over the front of the tumour and with the

Mesentery was flattened out between the tumour and the anterior abdominal wall.

GLANDS. Cervical not involved. Tracheal and bronchial slightly, but not markedly enlarged, except that behind the left sterno-clavicular joint.

Mesenteric not involved.

Retroperitoneal involved in the tumour.

Thyroid and Thymus normal.

The case was diagnosed as:-

"Renal Sarcoma."

In this case we have evidence of the forward spread in the fact that the lungs were affected, and also by the presence of the gland behind the left sterno-clavicular joint. The change to the Thoracic duct system, probably occurred at the root of the

lung. "Backward transport" is shewn in Liver and Lungs.

CASE 32.

POST MORTEM XIII 108.

C.T. aet. $7\frac{9}{12}$ years M. admitted Dec. 30th 1896 died Jan. 2. 1897 under care of Dr. Colman.

Has been under observation about 5 years with large grwoth in abdomen. Was delicate from birth, since 18 months old has passed blood in urine. Slight occasional abdominal pains, never severe until last fortnight. Abdomen has been enlarged for $3\frac{1}{2}$ years. Rarely vomits. No blood in stools. Had measles at 1 yr. Scarlet Fever when 7. Father and Mother alive and healthy, 3 other children alive and healthy. Patient is 2nd child.

C.O.A. Pale, anaemic, very thin. Irritable.

ABDOMEN Greatly distended and veins easily seen. Seems to be a small amount of fluid. Hard nodular mass felt in R. abdomen, extending in front to a little beyond middle line and behind to spine.

Just below last R. rib a nodular conical mass rises from surface, and a little nearer the spine another mass is seen forming a ridge parallel to the vertebral column, these masses are elastic and the skin over them is unaltered.
Abdomen is somewhat tender.
LIVER 3 F.b. below costal margin. Seems smooth on surface, but is rather hard.
SPLEEN not felt.
LUNGS Some dulness at R. base, with deficient breath sounds - otherwise normal.
HEART Normal. Not displaced.
Jan. 2. Red corpuscles 75% Hb 60%
1 white to 120 red corpuscles.
No increase of eosinophiles seen. Became worse rapidly.

POST MORTEM.

HEAD Brain. Meninges etc., normal.
THORAX A bulging soft elastic roughly conical

tumour, size of small tangerine orange, projecting just begind R. posterior axillary line at level of last rib, but not apparently connected with the rib. Another elongated ridge of similar soft elastic consistency, lying nearly parallel to vertebral columns, about 1½" distant from spines of vertebrae, over last lower ribs, these tumours were examined from inside and found to be masses of new growths, on sections shewing a mixture of dark purple highly vascular very soft tissue, and a slightly firmer purplish white substance evidently new growth; and this in the former case formed an isolated mass lying very close to the huge mass of growth in the abdomen, but not actually continuous with it, in the latter case also, the growth formed an isolated secondary mass, lying under the parietal pleura close to the transverse processes of the 10th and 11th dorsal vertebrae, and spreading between the ribs into the soft tissues of the

back.

PLEURA The L. contained about 5 ozs of slightly bloodstained serum.

The R. about 6 ozs. of similar fluid.

The pleura did not appear to be thickened anywhere, but there were nodules of growth, dark, slate-coloured varying in size from a pea to a cherry, under the R. parietal pleura at its lower part, close to the vertebral column, and also 2 or 3 nodules of similar appearance on upper surface of diaphragm on R. side.

MEDIASTINAL GLANDS. The Root glands on both sides were infiltrated with new growth, being soft, and of a pink, cream, or in some cases purple colour on section.

The largest was as big as a large walnut and was situated just above the root of the L. lung.

LUNGS. At lower anterior edge of R. upper lobe there were 2 or 3 nodules of new growths,

size of pea, in the substance of the lung.

The glands embedded in the lung substance at the root were also affected.

PERICARDIUM. On the outer surface were several small thickened purplish patches, thought to be early new growth, but the inner surface appeared normal.

ABDOMEN A large mass occupied whole of posterior walls of abdomen, most marked on R. side. It was covered by intestines, which were easily removed, except the duodenum, which was imbedded in it, but not infiltrated.

The mass consisted of an enormous lobulated tumour, having a smooth glossy surface (owing to covering of parietal peritoneum). It was of a slatey purple colour, and of an elastic consistency, almost fluctuating in places. It extended in front of the L. kidney which lay in the L. lumbar region, and was perfectly normal on section except that perhaps its pelvis was somewhat

dilated. The R. kidney however was completely involved by the new growth, for on searching through the mass to find it, it appeared that the greater part of the tumour consisted of enormously enlarged and infiltrated R. kidney, some of the lobules of the growth appearing to correspond to lobules of cortex, whilst in th centre of the mass was a purplish fibrous-looking area, which seemed to lie in the enormously dilated pelvis of the kidney and to consist of blood clot.

The kidney structure was scarcely recognisable; the section shewed many trabeculae of firm ? fibrous tissue, dividing off areas of soft highly vascular tissue, varying in colour from creamy white to dark purple, and in consistency from firmness to almost fluidity, and containing in parts calcareous spicules. The suprerenals were not identified. The whole mass weighed 3 lbs. 6½ ozs.

LIVER. Somewhat enlarged. Normal consistency.

Paler than normal. Surface quite smooth

On section it shewed a nodule of purplish white new growth, size of cherry - close to under surface of R. lobe; the peritoneal covering which was separated from it by about $\frac{1}{8}$" of apparently normal tissue, was much thickened at this spot. Elsewhere the liver capsule was normal.

There were large areas of the liver, which had a whitich translucent appearance, as if there was diffuse filtration with new growth.

SPLEEN and PANCREAS. Normal.

STOMACH and INTESTINES Normal.

MESENTERIC GLANDS Normal.

RETROPERITONEAL GLANDS greatly enlarged and infiltrated with new growth, forming the portion of the mass on the L. side.

Glands in portal fissure slightly enlarged and infiltrated with new growth.

BLADDER and URETERS appeared normal, but the latter could only be examined for about 2-3" above bladder, the remainder being embedded in the growth.

MICROSCOPICAL EXAMINATION.

A section of growth removed from lungs in R. lumbar region was made in Aug. 1895. Skin over it was normal. The rest shewed masses of large cells, grouped more or less in alveoli, the intervening substance being like young fibroid tissue in appearance, with many spindle-shaped nuclei; the fibrous tissue formed thick trabeculae, but on careful examination it was seen that much finer strands of it passed also in between the large cells described, so that in reality, there was no strictly alveolar arrangement.

The large cells were in some parts round, but mostly appeared to be compressed into different shapes quite irregularly, so that most were polygonal; they had a single necleus. The arrangement was described by Dr. Colman as "Deodriform"

Diagnosis given as
New Growth in R. Kidney.

In this case "the suprarenals were not identified".

Forward spread well defined - appear surface R. side of diaphragm - glands at root of lung and along outer surface of pericardium.

"Backward transport" Liver, and Lungs. Direct extension into pelvis of R. kidney. Also in this case some evidence of spread from L. suprarenal - in lumbar glands, and those at portal fissure.

CASE 33.

P.M. VIII, 136.

A.B. aet. 4½ yrs. f. Admitted Oct. 12, 1888, died Oct. 13, '88, under care of Mr. Morgan.

Four weeks ago she fell against edge of table, complained of great pain and abdominal swelling was noticed, and this has increased since.

C.O.A. Very wasted and pale.

Right hypochondriac, lumbar and iliac regions occupied by smooth globular swelling, bulging ribs and extending to midline in front. The front fluctuates, behind it feels more solid. Dulness over swelling, extending to 4th space in nipple line.

Edge of liver felt ½ - 1" below ribs. Swelling is not tender.

Oct. 13. Laparotomy performed. Right kidney seen to be greatly enlarged and surrounded by soft tissue probably sarcomatous,

which broke down readily under finger.

P.M.

On opening abdomen a large cyst was found reaching from liver to crest of ileum. It was situated in front of a large mass of tumour and contained grumous fluid and debris of soft new growths. A large and partially solid tumour was lying entirely behind peritoneum.

It commenced on the left side of the spinal column behind the stomach and passing across to the right side reached to the liver. Right kidney and iliac fossa. The duodenum ad colon were stretched across the anterior surface of the tumour, and it involved the under surface of the liver behind the portal fissure, and the hilum of the kidney. The head of the pancreas was also involved in the growth and the under surface of the diaphragm.

The right suprarenal capsule could be distinguished lost in the tumour.

The right kidney was much enlarged and the hilum was softened and infiltrated with the new growth. The kidney could be shelled out of the surrounding growth. No secondary deposits found anywhere else, and the remaining abdominal and the thoracic organs were quite healthy.

On cutting into the tumour it was composed of sarcomatous tissue, mostly very soft, in places however semisolid, and was dark in colour, with lighter cream-coloured patches.

This case was diagnosed as:-
Abdominal Tumour - Soft Sarcoma.

The "right suprarenal capsule was seen lost on the tumour", probably the cortex.

This case shews no lymphatic spread, but the direct extension through the kidney hilus is seen at an early stage.

CASE 34.

P.M. VI. 202.

A.K. aet. 2½ yrs. admitted Sept. 27th 1883, died Nov. 5th, 1883, under care of Dr. Cheadle.

Twelve mos. ago the belly began to swell, and there was occasional pain. Nausea but no vomiting. No haematuria. Had measles when 1 yr. old. Father and Mother alive and healthy. 3 children. No miscarriages. C.O.A. Large veins over front of abdomen, more marked on right side. Both loins resistant to palpation - right much more than left and it extends into flank.

Circumference of abdomen = 21" at point 2" above umbilicus.

Dulness on percussion over whole of right side almost up to umbilicus.

Oct. 2. Right leg swollen - not the foot. Does not pit easily if at all.

Oct. 5. Circumference of abdomen 23".

Oct. 12. Exploring syringe passed into tumour, drawing only blood.

Oct. 18. Urine acid. No albumen.

Oct. 19. Circumference of abdomen 23 7/8".

Oct. 23. Temperature 103.4°. Skin dry and hot. Lungs - bases impaired percussion - breath sounds normal. Patient paler.

Oct. 24. Right leg and foot more swollen - pits on pressure.

Some swelling of right hand.

Cervical glands enlarged.

Oct. 27. No fresh symptoms.

P.M.

On opening abdomen some fluid escaped from peritoneal cavity. The liver was flattened and too much exposed. The Spleen was much enlarged. A large tumour occupied the right half of the abdomen, reaching a little beyond the middle line to the left, extending downwards into the iliac fossa, filling the right loin and reaching upwards as high

as the uppermost limit of the liver. The diaphragm was so much displaced upwards and the cavity of the thorax so much encroached upon that all the thoracic viscera could be very easily removed by cutting away the diaphragm.

On removing the liver, spleen and intestines, a better view was obtained. The duodenum was then found in front and to the left of the upper half of the tumour and the pancreas just to the left of this and in front of the tumour.

The aorta and vena cava skirted the sessile base of the left of the tumour, and were a little displaced towards the left. The left adrenal and kidney were natural. The right adrenal was not recognisable as a normal structure but the topmost part of the tumour might very well be this body infiltrated with new growths.

LUNGS. The left lower lobe, in the anterior

part of its lower margin shewed a nodule of new growth, size of ½d. piece, soft and vascular.

The right middle lobe, in its lower margin showed 2 nodules, smaller than the one in the left, whiter, though nearly as soft.

The central portions of the right lower lobe was solidified and soft at parts.

PELVIS. Between the bladder and uterus is a structure of lobulated outline and having the aspect of a thymus gland, and it was soft and vascular.

Other pelvic organs natural.

HEART. Nil.

Other organs natural.

Brain and cord were not examined.

Section of the tumour shewed that the renal tissue was expanded over it, and between the kidney substance and the growth were the distorted and compressed calices of the kidney.

There can scarcely be any doubt that the tumour was originally extrarenal and had grown into the hilus, expanding the healthy tissue over it.

The section has a pale whitish colour with a haemorrhage the size of a walnut about its centre - encephaloid. It weighed about 8½ lbs.

The diagnosis was:-

"Renal Tumour, apparently of extra-renal origin."

In this case the direct extension is well marked. The renal tissue was expanded over the tumour "and there can scarcely be any doubt that the tumour was originally extrarenal and had grown into hilus."

The "backward transport " (from a forward spread of necessity) is seen in the lungs.

CASE 35.

POST MORTEM IV. 228.

W.R. aet. 4 yrs. Admitted July 23rd, 1878, died Sept. 18th, '78. Under Dr. Cheadle.

M. is phthisical.

Has been wasting since Dec. '77 - "Stomach enlarging for some time. Nausea for past 6 weeks - no vomiting.

C.O.A. Pale - not thin.

ABDOMEN large - no fluid. A fixed round tumour in L. iliac fossa - size of chestnut. Kidney readily palpated in L. lumbar region.

On R. side a tumour at site of kidney which reaches back to lumbar muscles and forwards to level of anterior superior iliac spine. A row of hard lumps are felt below margin of liver, and scarcely separable from it.

URINE contains no albumen.

Aug. 14. Wasting fast. Jaundiced for last 2

days, urine contains bile, stools pale.
Aug. 21. Much jaundiced, abdomen larger.
Sept. 11. R. lumbar tumour the only one to be felt. Base of R. axilla and infrascapular regions dull. Urine bile stained.

POST MORTEM.

Emaciated. Four ozs. serum in peritoneal cavity, the colour of porter.

ABDOMEN. An enormous retroperitoneal mass occupies almost the whole abdomen in the folds of the mesentery, and reaching back to spine. The common bile duct is imbedded in the mass, but is patent.

The tumour has grown into the liver in bands along the portal canals, and forms mass around the canals. The mass has grown into the R. kidney, distending this organ to a considerable size, and the renal pelvis is squeezed out on the tumour.

The suprarenal capsule is affected, forming a mass half the size of the kidney, but distinct from it.

L. KIDNEY & SPLEEN quite natural. Other organs natural.

On section the abdominal mass looks like much enlarged lymphatic glands embedded in a firm red matrix.

Diagnosis given as: -

RETROPERITONEAL TUMOUR

invading R. kidney, Liver and Suprarenal capsule.

The spread in this case was probably all direct extension. Bands of growth passed into Liver along portal canals. Also into R. Kidney, the kidney substance being spread out over it.

CASE 36.

POST MORTEM IV. 202.

H.C. aet. 4 yrs. m. Admitted June 26, 1878, died July 31, '78. Under care of Dr. Cheadle.

F. died of tubercle 4 yrs. ago.

2 children dead - 1 of dropsy of stomach. Patient wasting since Jan. '78 Abdomen enlarging and pains in L. side for past 2 months. No vomiting.

C.O.A. Child is pale and emaciated. No jaundice Abdomen distended, skin thin; enlarged veins over abdomen. Nodular appearances of abdomen, rising and falling with respiration. A hard, fixed, rounded lump above umbilicus. Largest tumour in L. side of abdomen filling the region of kidney and spleen, and very hard, lobulated, dull on percussion. Anterior edge rounded - no notch. Posteriorly it reaches to lumbar muscles. Above passes beneath ribs. Below passes into iliac fossa and is not separable from the bone here.

Weak respiration and dulness in left infrascapular region.

July 17. Much pain in back and oedema. Swelling very obvious on L. side abdomen, between lower ribs and iliac spine.

URINE. Slight trace albumen. T. remained normal.

July 27. Progressive emaciation.

POST MORTEM.

Much emaciated.

ABDOMEN. Few ozs. clear serum in peritoneal cavity. Tumour in L. iliac fossa is enlarged.

Kidney. An enormous retroperitoneal mass, weighing 47 ozs. (as large as a child's head) is present, composed of numerous lymphatic glands from size of pea to a horse chestnut imbedded in a firm, glistening, gelatinous-looking white tissue.

This forms a lobulated mass in the mesentery, making most of the intestines sessile. There is much purple colouration of the mass, and it is soft, semipulpy and granular in parts.

The tumour crosses the spine below the 8th dorsal vertebra and dips between the last 3 L. ribs - but does not invade them. It passes into the R. iliac fossa, and the glands along the iliac vessels are enlarged and similar in character to tumour. Some retroperitoneal thickening in pelvis.

BLADDER - natural.

R. KIDNEY. Contiguous to mass but not invaded.

L. KIDNEY. The tumour is continuous with a lump in the hilus of the L. Kidney. The latter retains its normal shape and is readily shelled out of its bed. Its substance is very hard (about that of normal kidney tissue) lobulated and mottled red,

surface of R. lobe of Liver and also that it is contiguous to the R. kidney, has determined me to include it. The forward spread here, which I must assert again is not likely to be noticed unless specially looked for, has not been indicated, but "backward transport", which is dependent on its existence, is well shewn. We have a growth on upper surface of Liver, of some small round tumours beneath the capsule.

Then the bronchial glands are affected, and some in the lung.

Direct extension here, has taken place to

of L. kidney, the substance being spread out over it.

CASE 37.

P.M. IV. 182.

R.N. aet. 2 4/12 yrs., m. Admitted April 25th, 1878, died April 30, '78., under care of Dr. Dickinson.

Youngest child. 5 dead, whooping cough etc. No history of syphilis or tubercle.

On April 8th vomited food and yellow liquid, and this lasted for three days. Wasting rapidly. Urine high coloured. Pain left side abdomen. On 19th skin jaundiced. Motions white and have remained so, since. Abdomen enlarging.

C.O.A. Extremely pale and emaciated. Jaundiced. Papular rash on chin and forehead. Abdomen distended, thin walled - flanks dull - fluctuation obtained.

Liver dulness about 3½" wide - 2 f.b. below cost. margin. Spleen not felt.

Below liver in right nipple line a soft transverse

band 2 x 1" is felt.

A large tumour reaches from pelvis to umbilicus and into right iliac fossa - almost covered with bands of intestine which slip under the finger. Very firm - passes below into the pelvis - not tender. A part seems separable to the left.

Resonant on percussion.

Glands in both groins a good deal enlarged.

April 30. Thinner and more jaundiced. Motions white. Per rectum a tumour can be felt, dipping down into pelvis, and can be moved a little.

P.M.

Body much emaciated.

PERITONEAL CAVITY. A good deal bile stained, serum present. The tumour consists of a large mass in front of the bottom of the spine - about half the size of an orange - covered by the intestines.

It is retroperitoneal and extends beneath the parietal peritoneum to the anterior abdominal wall - fills the iliac fossa and passes in front of the kidneys (which are readily separable from the growths), to the hilus of the liver, embedding all the structures here, and thus causing the jaundice probably.

(Gall bladder tense and contains a very pale, viscid, clear, yellow fluid). From here the tumour spreads near the spine to the under surface of the diaphragm which appears completely invaded and thickened in the anterior part, being about 1" thick, and very rigid.

It is in small areas adherent to the liver and here small growths are present in that organ.

A small mass is adherent to the under surface of the sternum in front of the heart and right lung. There appears to be some thickening of thd intestinal wall in the region

right lung. "Backward transport" to Liver.
As to growths in kidney the description
is very indefinite - we have already seen how
pressure on ureters may be the predisposing
cause for a suppurative pyelo-nephritis, which
has been mistaken for secondary growths.

of the vermiform appendix.

KIDNEYS. Small secondary growths in both, the largest about size of a hazel nut.

LIVER also contains some small secondary growths.

The growth had a firm whitish-yellow appearance and a fibrous resistance when cut.

Microscopically - Lympho-sarcoma.

Diagnosis given as:-

Retroperitoneal Tumour.

No mention of suprarenals here, but growth "passes from kidney to hilus of liver."

Direct extension here again shewn running forwards between parietal peritoneum and muscular layer of abdominal wall.

Forward spread shewn through diaphragm to anterior mediastinum; and here "a small mass was adherent to sternum in front of heart and

CASE 38.

POST MORTEM IV. 58.

T.S. aet. $2\frac{9}{12}$ years. M. Admitted Dec. 11th., 1876, died Dec. 29th '76. under care of Dr. Cheadle.

Mother and Father healthy. No tuberculosis on tumour on either side. Other children, 1 alive, 1 dead, aet 24 hrs., from tumour in windpipe.

P.H. Has been falling away for past month, beginning with pains in "stomach" and diarhoea.

C.O.A. Extremely pale child. Subcutaneous tumour in R. interscapular region over 8th and 9th ribs - smooth, firm, non-fluctuating.

HEART. Apex bruit, 4th sp. in L.N.L.

Apical systolic murmur.

Rt. posterior base very dull, bronchial breathing and rales. Pleuritic friction below R. nipple, urine, slight trace of alb.

Dec. 14. Complained of abdominal pain in sitting up.

Dec. 16. Subcutaneous tumour over back is larger,

now shining and oedematous. Marked dulness over R. lung behind and friction in axilla.

Dec. 26. Liver much enlarged, reaches 1" below umbilicus. ? Spleen also enlarged. Along the junction of the two is a rounded flattened nodule. In addition there is a large tumour in R. hypochondrium which appears to pass under the egde of the liver and can be traced behind and below the last ribs to the lumbar muscles in front of which it passes.

Child is rapidly losing flesh.

Dec. 28. Some fluid received from subcutaneous tumour on back, by hypodermic needle, it showed granular pus-like corpuscles.

Dec. 29. Tumour is R. hypochondrium very prominent and moved visibly with respiration. Reaches to within 1 f.b. of ant. sup. iliac spine.

POST MORTEM

LUNGS. Large fleshy mass in R. pleural cavity - firmer than blood clot - and about 1" in thickness. This attaches lung to diaphragm and to

chest wall over lower and posterior parts, but the lung can be separated from it. The apex is free. This mass is firmly adherent to the ribs posteriorly - which are not softened - and it projects back between them to form the subcutaneous nodule noted during life. It crosses over the vertebral columns to the opposite side, where it is subpleural and sheathes one of ribs.

Under the visceral pleura of both lungs are small pale greyish nodules about the size of millet seeds - some larger and pyramidal, and these do not show streaks of haemorrhage like the other growths.

The glands of the posterior mediastinum are large - one with grumous liquid contents.

HEART Nil abnormal.

ABDOMEN No fluid in peritoneal cavity.

LIVER Depressed and tilted over to L. by a large tumour situated to the R. of and below the liver. It is rounded, size of a small orange,

quite smooth and of a deep maroon colour and is connected with a much larger tumour situated behind it, which has displaced the R. kidney downwards and lies in its place. The whole mass is retroperitoneal and is about 4" x 3". It is very soft and pulpy, of a dark chocolate red colour. At one part on section it presents paler granular, yellowish areas, looking not unlike the substance of the suprarenal capsules .

The tumour is closely adherent to the liver above, but does not invade it. The mass spreads across the front of the spine, and sends up a prolongation through the diaphragm.

Downwards it runs over the pelvic crest into the pelvis and forms a nodular tumour there, probably in the lymphatic gland.

R. KIDNEY. Compressed and atrophied by the growth - not invaded, but secondarily affected at one part, away from the tumour by a small pyramidal growth - with base to surface and is

haemorhagic.

L. KIDNEY Suprarenal capsule healthy.

SPLEEN Normal - no new growth.

LIVER 17 ozs. Very large, pale and soft. About 6 small subcapsular petechial about the size of hemp seed, correspond to as many growths.

One large mass of similar growths - as large as a hazel nut - in liver substance above the gall bladder.

The Diagnosis made was

"DIsseminated Sarcoma".

Here the forward spread is well marked diaphragm being enormously thickened and spread occurring behind pleura over vertebral column

to L. side.

Then we have the gland in the posterior mediastinum.

"Backward transport" is seen in subcapsular growths in Liver, and in subpleural growths in lungs.

The lesion in the kidney suggests a haemorhagic infarct and not new growth.

CASE 39.

P.M. III, 120.

C. K. aet 2, f. Admitted Aug. 5, 1872 died Aug. 18, '72., under care of Dr. Dickinson.

On July 29th seemed languid and her abdomen became slightly swollen and painful. It has increased in size ever since. On Aug. 4th swelling of legs noticed. No swelling of face. No vomiting. Urine dark in colour, scanty, has a white deposit on cooling.

C.O.A. Fair complexioned child, breathing quickly - abdomen enormously distended, legs much swollen, but face and eyelids not at all swollen.

CHEST. Dulness at both bases. Breath sounds and V.R. feeble here. Rhonchi and creps. all over back of both lungs.

HEART. Sounds not heard owing to rhonchi.

ABDOMEN. Much distended. 23½" at level of umbilicus, 25" midway between umbilicus and ensiform cartilage. Superficial veins

very prominent. Marked pluctuation. Dulness on percussion in flanks. Liver edge cannot be made out.

URINE. Acid. No albumen. Has a thick yellow flaky deposit.

Aug. 8. Abdomen 21" midway between umbilicus and ensiform.

Aug. 9. Abdomen 26¾" between ensiform and umbilicus. Tapped 33 ozs. of red coloured liquid. Fluid contained red and white blood corpuscles, columnar epithelial cells, cells apparently of the nature of granulation cells, and some pus cells. It was intensely albuminous. Sp. gr. 1016. After tapping abdomen measured 23½" midway between umbilicus and ensiform.

Aug. 13. A nodular uneven swelling could be felt, which seemed to be continuous with the liver. In the right iliac region it was much harder and more prominent than elsewhere and could be traced around the right flank backwards to the edges of the false ribs.

From this onward till Aug. 18th she gradually became weaker.

P.M.

On opening abdomen a quantity of reddish coloured serous fluid flowed out, similar to that drawn off, but not quite so dark.

A large irregular mass, nearly as large as a cocoa-nut was then seen, growing apparently from the peritoneum or subserous tissue on the right side of the abdomen below the liver, and sending prolongations in all directions. One part burrowed between the muscles of the abdominal wall in the right flank, extending backwards to the false ribs; another part passed upwards on the convex surface of the liver, indenting its surface in places to the diaphragm to which it was firmly attached; this part was also attached to the posterior right border of the liver, and other portions were attached to the under surface of the liver.

Another part projected into the cavity of the abdomen.

Large masses from the size of a nut to that of an apple were also seen growing from the omentum and mesentery, independently of this growth - some parts being red, congested and hard, other portions pale, soft and friable. It was attached to the liver in parts by adventitious tissues, which could in places easily be dissected off - in other parts it was so adherent that the liver-tissue gave way on endeavouring to separate it from that region. When the tumour was cut into, an irregular cavity was discovered in its interior, sending prolongations in various directions. Scrapings from the surface of the tumour, when examined under the microscope shewed a number of rapidly growing cells of various shapes, containing nuclei, nucleoli, granular matter and fat globules.

LIVER. Wgt. 17½ ozs. Pale, but shewing

patches of what appeared to be extravesated blood on its surface in places.

At other parts white patches were seen, some rather largerthan a pin's head, others as large as a fourpenny piece, the latter corresponding in position to the indentations above mentioned.

They extended for a short distance into the structure of the liver, and were probably of the same character as the growth.

DIAPHRAGM. Congested in parts, in other parts having the growth attached to it.

LUNGS.· Scattered patches of lobular pneumonia throughout all lobes.

PLEURAE. No fluid. No adhesions.

HEART, Spleen and Kidneys normal.

GLANDS. Thoracic glands somewhat enlarged, softened, containing soft creamy matter.

One or two bronchial glands enlarged, containing similar material to the thoracic.

Mesenteric glands - some as large as

an apple, others the size of a walnut, and some still smaller - some hard, red, congested, others soft, white, easily breaking down. THE PORTAL VEIN was found to be enclosed and compressed by portions of the cancerous mass.

Diagnosed as:-

"Medullary cancer growing from the Peritoneum and compressing the Portal vein, causing acute ascites.

Drawing.

This case bears a striking resemblance to No. 28.

No mention of suprarenals here, but growth was below right lobe of Liver and applied to it, and its spread so closely corresponds to my own case that I have no hesitation in including it.

Forward spread - diaphragm, thoracic glands and bronchial glands.

"Backward transport" gave subcapsular growths in liver, mesenteric glands and omentum.

CASE 40.

POST MORTEM II. 99.

J.Z. aet. 2 5/12, m. Admitted Feb. 7, 1867, died Feb. 17, 1867. Under Dr. West.

Quite well until 4/12 ago, when he complained of pain in abdomen and commenced wasting. One month later his abdomen was noticed to be large and 6 weeks ago the lump in the R. Lumbar Region was seen. No jaundice. No vomiting. No discoverable cancerous, phthisical or syphilitic antecedents.

C.O.A. Greatly emaciated - waxen colour - no oedema - very hard tumour felt in R. side of abdomen. Liver felt about 4 f.b. below costal margin in R.N.L. and below and behind this degree masses were felt.

POST MORTEM.

Large tumour filling the whole of the R. side of the abdomen (except part occupied by Liver) and reaching to transverse processes of vertebrae on L. side. Above the tumour was intimately connected

with the under surface of the R. lobe of the liver; yet by breaking down adhesions the two can be distinctly separated, except at one part where they are fused.

The hepatic flexure of colon is imbedded in the mass, but not invaded by it. The tumour has involved Liver, R. Kidney, R. Suprarenal body and root of mesentery.

The spleen, L. Kidney, Pancreas, Gallbladder and mesenteric glands were unaffected.

The Aorta ran through the mass, but was not involved in it.

A very large mass filled up the pelvis of R. Kidney, and the kidney substance was greatly narrowed as if atrophied. A considerable part of the convexity of the kidney is easily separable from the mass of the tumour, the renal capsule being intact.

There is a large mass between the kidney and liver in the situation of the R. suprarenal. The

tumour consists of about equal parts of white encephaloid cancer and of haemorrhagic cancer - no cysts.

Growth 8 x 6" Weight 5½ lbs.

LIVER. Healthy, except numerous small cancerous deposits.

PLEURA. Old adhesions on under surface R. lobe. In the posterior mediastinum, behind the heart, there was a mass of cancer, the size of a small pear - not continuous with abdominal mass.

Diagnosis: -

CANCEROUS TUMOUR IN BELLY

This case shews "forward spread" to cancerous mass behind heart. "Backward transport" to deposit in liver.

Direct extension to R. Kidney pelvis, substance being squeezed out over it.

In addition to the cases already mentioned I have collected and placed in these tables 11 other cases from the literature, in 9 of which the right suprarenal was alone affected, in the remaining two both suprarenals were affected, right however more than left.

An analysis of the 30 cases in which the right suprarenal contained the primary growth gives interesting results, and on doing this we find they fall roughly into three groups:

(1) Those in which the whole growth has remained confined below the diaphragm, i.e. an Abdominal Group. This includes cases 29, 33, 35, (?)41, 42, 43, 44, 45, (?) 46, 48, 49, 50 and 51.

(2) Those in which the growth has affected abdominal and thoracic lymphatics, i.e. an Abdomino-thoracic Group. This includes

cases 28, 30, 31, 32, 34, 36, 37, 38, 38, 40, (?) 41, (?) 46, and 47.

(3) Those in which the growth has affected abdominal, thoracic and cranial lymphatics, i.e. a Cranio-abdomino-thoracic Group. This includes cases 22, 23, 24, 25, 26, and 27.

In a large number of the cases there has been a direct extension to right kidney, in 11 in all (cases 22, 26, 27, 28, 31, 32, 33, 34, 35, 40 and 45).

In 2 cases (36 and 46) the extension had occurred into the pelvis of the left kidney. In Case 24, both pelves shewed growth passing into them.

The Liver was also very frequently involved, 21 times in all (cases 22, 25, 26, 27, 28, 29, 30, 31, 32, 35, 36, 37, 38, 39, 40, 41, 43, 47, 49, 50, and 51.

The Lungs were the seat of secondary

growths on 10 occasions (cases 25, 28, 30, 31, 32, 34, 36, 38, 39 and 47).

A point I wish to lay stress on is in regard to the involvment of the Liver, for it is quite different in the two sets of cases, I mean the right and left.

In the right Group the secondary growths are subcapsular, and gain entrance by the lymphatics over the posterior part of the liver which is uncovered by peritoneum.

In the left Group the entrance is effected by the lymphatics entering at the portal fissure.

When we come to the Lungs apparent variations are probably accounted for by the anastomosis of lymphatic vessels at the root.

For several reasons it would seem as if the lymphatic drainage from the right supra-renal medulla, were much less perfect than that from the left.

(1) The greater size attained by the primary growth on the right side, this occurring in the great majority of cases.

(2) The much greater number of cases belonging to the Abdominal Group, which occur with the right suprarenal as compared with the left. We have 13 right to 3 left. And if we take the Abdomino-thoracic Group the disproportion is greater still, namely 24 right to 4 left.

I now come to the end of my discussion on the mode of spread, and before passing on I must emphatically protest against the erroneous idea of this being a disease of suprarenal medulla with secondary deposits in bone. True the secondary deposits do occur in bone, but only in those bones which are on the lymphatic system connected with the suprarenal affected, and then not only are those bones

affected, but every organ, with the single exception of the Spleen, may be, and has been in different cases, involved, and the lymphatics connected with the bones or viscera so involved must also be affected, in other words, the spread is by the lymphatic system,- the Thoracic duct system, in the case of the left Suprarenal medulla, the right Lymphatic duct in the case of the right Suprarenal medulla, and the parts affected are determined by the distribution of these systems and by that alone.

I have drawn up a diagrammatic representation of these two systems, which will explain every secondary growth that can occur, when either suprarenal is affected.

E T I O L O G Y

AGE. The youngest case I have been able to find was aged 2 weeks, the oldest 10 years.

The age incidence, of all the cases, which I present in the form of a chart shews that the largest number of cases occurred between the ages of 2 and 3 years. The next highest number occurs under 1 year. By far the greatest number of cases occurred before the age of 6.

SEX. In this series of cases there are 27 males to 19 females. (In 5 cases sex not stated). Hutchison in his series found 7 males to 3 females.)

HEREDITY. seems to play no part. In not a single case was there evidence of anything similar having occurred in the family.

TRAUMA This cause has been described in several of the cases, but this is of such frequent occurrence in children, that I think no importance can be attached to it.

GENERAL PREVALENCE The Hospital records contain 6848 autopsies on children under 12 years, and of

these 24 were cases of this disease.

CLINICAL FEATURES.

SYMPTOMS. As in all other diseases occurring at this age, very little in the way of symptoms can be expected, most of the cases occurring under 5 years of age.

PAIN. The presence of this has been observed in many of the cases, either by the child itself complaining of it, or by its constantly putting its hand to the site where it is felt.

In 22 of the 51 cases, pain was present. Of the 21 cases associated with growth in the L suprarenal medulla, pain was noted in 9 cases.

Of the 30 cases, where the lesion was on the R. side it was noted in 13 cases.

Of the 9 cases in which it was found when the L suprarenal was primarily involved; in 6 it occurred in the lower limbs (5 in L. lower limb, 1 in the R.), in 2 it was abdominal, and in 1 the site is not stated.

Of the 13 cases associated with Right sided disease, it was <u>never</u> present in the limbs, but

always abdominal.

The explanation of why the common site of pain in the L. sided cases should be in the lower limbs, and in the R. side never here, but usually in the abdomen, rests on the facts that have been already pointed out in connection with the mode of spread.

On the L side, it will be remembered the spread is to the lumbar glands, in some cases passing down along the iliac lymphatics, and that this does not occur on the R. side.

The pressure produced by these secondary growths, on the lumbar plexus of nerves, is sufficient I think to account for the pain.

PHYSICAL SIGNS.

If my view of this disease is correct, the "clinical syndroms" laid down by Hutchison would only apply in a certain number of the cases, that is to the ones I have included under the term Cranio-Abdomino-thoracic group, and this is the smallest.subdivision of the three.

The simplest way to regard the physical signs, is from the point of view of the three groups.

(1) The Abdominal Group.

This group, as we have seen, comprises chiefly cases associated with the right suprarenal. The first thing noticed was usually abdominal pain and swelling, and the latter along with progressive emaciation may be the only signs during life.

The Blood shews a marked secondary anaemia, the red blood corpuscles in some cases falling as low as 1,500,000. A slight leucocytosis has occasionally been noted, but this has never usually been above 15000, (though in case 28, 25,0,00 leucocytes were found on admission, but these fell to 12000 shortly afterwards).

The differential count has been practically normal for the child's age.

There is marked pallor, recorded in most of the cases and present in all I have seen.

The abdominal tumour when palpable is rounded and firm in the early stages, not moveable, does not move with respiration and is absolutely dull on percussion. It is usually sharply defined on lower and inner sides, the upper end passing under the costal margin.

In many of those cases there is enlargement of the liver, and when the growth is primarily in the left suprarenal, this would be very obvious. On the right side however it would be impossible to distinguish it from the primary growth.

HAEMATURIA, which might be expected when the growth has extended into the pelvis of the kidney is of very infrequent occurrence.

BLOODPRESSURE. This I observed in two of my cases, in one (No. 1) the systolic pressure =

80 mm. of mercury, in the other it was equal to 98 mm. of mercury, (case 28), the latter being an older child.

TEMPERATURE. This as a rule shews practically no variation from the normal..

(2) The Abdomino-thoracic Group.

This group gives rise to all the signs described in Group 1, and in addition may possess signs of its own. These may according to the suprarenal affected.

(a) When the primary growth is on the left side. In 6 of the 10 cases collected from the Hospital records, in which the spread has taken place through the posterior mediastinal glands, a systolic murmur heard all over the praecordia, usually loudest at the apex, has been noted. This has been so rarely observed when the growth has been on the right side, that I am inclined to think it is possibly due to pressure on the large arteries arising from the heart, by the enlarged glands.

(b) When the primary growth is on the right side.

Owing to the large size attained by the primary growth on this side, the right lower lobe of the lung, becomes compressed, giving dulness on percussion and feeble breath sounds.

(3) The Cranio-abdomino-thoracic Group.

This group includes all the physical signs recorded under Group 1 and 2, and in addition possesses signs of its own. These are well described by Hutchison[16] in his paper.

The Primary Growth in these cases however frequently remains small in size and may not be observed during life.

Of the 23 cases belonging to this group the primary tumour was felt during life in 14, and from the postmortem appearances it should have been palpable in at least 3 of the other 9.

CERVICAL GLANDS. These became affected first on the same side as the primary growth and appear before the cranial growths or

exophthalmos occur. This was well seen in Case 2, which I myself observed, and it has been indicated in several of the others which were seen before the cranial growths had appeared. Later the glands on the other side also became involved owing to the anastomosis between the lymphatic vessels here.

ECCHYMOSIS INTO EYELIDS, OR OEDEMA OF EYELIDS.

In 15 of the 23 cases this was present usually occurring before the exophthalmos and indicates that the growth in the sphenoid is making its way to the surface.

EXOPHTHALMOS. In 19 of the 23 cases this developed, and I have already drawn attention to the fact that the eye in which the proptosis first appears, gives the key to the suprarenal affected.

In both the cases of this group which I observed, ulceration of the cornea occurred, and this has not infrequently taken place.

OPTIC NEURITIS. In 9 of the 19 cases in which exophthalmos occurred, this was present. In the 4 in which there was no proptosis it was not found. In 10 other there is no note of any opthalmoscopic examination, but in one of these (case 17) the eye was destroyed.

CRANIAL GROWTHS. Present in all of the 23 cases. Many of those were present when the cases came under observation, but it is interesting to note that when observed at commencement the early growth in nearly every instance was on the same side as the proptosis, i.e. on the same side as the suprarenal affected. One exception to this is case 1 in which the growth first appeared in the right temple and here the proptosis was apparent first on the right side (result of anastomosis). Lastly in both my cases of this group, pain in the chest was complained of shortly before death, due I believe to the growths on the inner surface of the ribs.

In(Case 2) which seems to have come under observation at an earlier stage than any other in the literature, the diagnosis of Rheumatism was made owing to the pain in the L. knee and the apical systolic murmur. The ecchymosis appearing in the L. eyelid however gave a clue to the real condition, and the tumour of the L. suprarenal was soon afterwards palpated.

The first two groups are often confused with Renal Sarcoma, not only during life, when the diagnosis is almost impossible, but also postmortem owing to the direct extension into the kidney. But in this case we have the renal substance spread out over the tumour, and the cells are of the round and oval uncleated type and not the spindle cell which Bland-Sutton states are found in the renal sarcoma.

Moreover the growth in the suprarenal body can be distinguished if carefully looked for.

I am convinced that many growths formerly

classified as Renal Sarcoma, really belong to and should be included under this group.

In the cases taken from the hospital records, I have given the diagnosis under which they have been there classified, but I think there is no doubt they should have been put under the class which I am dealing with.

From tumours of the cortex there is no difficulty in making the diagnosis, none of the cases I have collected shewing either precocity or pigmentation.

Infantile scurvy as Hutchison points out may cause proptosis and swellings on skull, but the other signs of that disease along with the history of the case should prevent confusion.

Chloroma also may give somewhat similar appearances, but the peculiar tint described in those cases, the blood changes and the appearance of the growths after death present no difficulty in distinguishing between them.

PROGNOSIS.

This disease invariably proves fatal. As a rule the younger the patient, the quicker the termination takes place. My figures shew durations from 18 months to 12 days. One case is described as having had it for 6 years, but this is open to doubt.

Operation in these cases seemed to offer little hope of success, for the diagnosis is not usually made until the spread has commenced and the removal of the primary growth is useless.

SUMMARY.

1. That the malignant growth occurring in the suprarenal medulla in children is a carcinoma.
2. That the dissemination of this growth takes place through the lymphatic system.
3. That the medulla of the Left suprarenal capsule is supplied by tributaries of the thoracic duct, whilst that of the Right Suprarenal is supplied by tributaries of the Right Lymphatic duct.
4. That in consequence the secondary growths occur along the main trunks and tributaries of these two vessels and thus shew considerable differences, depending on which suprarenal the primary growth is situated in.
5. That this can be demonstrated during life and also at the autopsy.
6. That the majority of cases occur during the first three years of life, then there is a gradual decline in number until the sixth

year, after which year cases very rarely occur.

7. That the clinical features of the case depend on whether the growth has remained localised to the abdomen, or has spread to the thoracic cavity, or has gone further and affected the structures of the head and neck.

8. That in a great number of cases the diagnosis is easily made during life'

9. That the duration of the disease varies from 2 weeks to 18 months and is always fatal.

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